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ABSTRACT

The Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT3I) is a cooperative effort among education and research institutions in New Mexico to analyze problems in transferring environmental technologies from Department of Energy laboratories to small and medium enterprises (SME's). To identify and analyze environmental concerns, the ECMT3I conducted two surveys, one of state environmental regulators, and another of manufacturers and private research and development firms in New Mexico. Study findings, based on responses from 5 state and city environmental departments and 100 local SME's, included the following: (1) in general, business owners demonstrated great concern over any negative effects their manufacturing operations may have on the environment, and agreed with the need for environmental regulations; (2) they also indicated, however, that while they wanted to comply with regulations, they did not always fully understand them or know where to get help; (3) in general, owners of businesses with less than 20 employees did not know which regulations applied to them, which substances were hazardous, had never been visited by an environmental regulator, and assumed they were operating within the law; (4) most companies developed environmental, safety and health programs using in-house resources; and (5) community colleges, universities, and federal labs were not viewed as sources of training, information, or problem solving. Extensive data tables and the survey instruments are appended. (KP)

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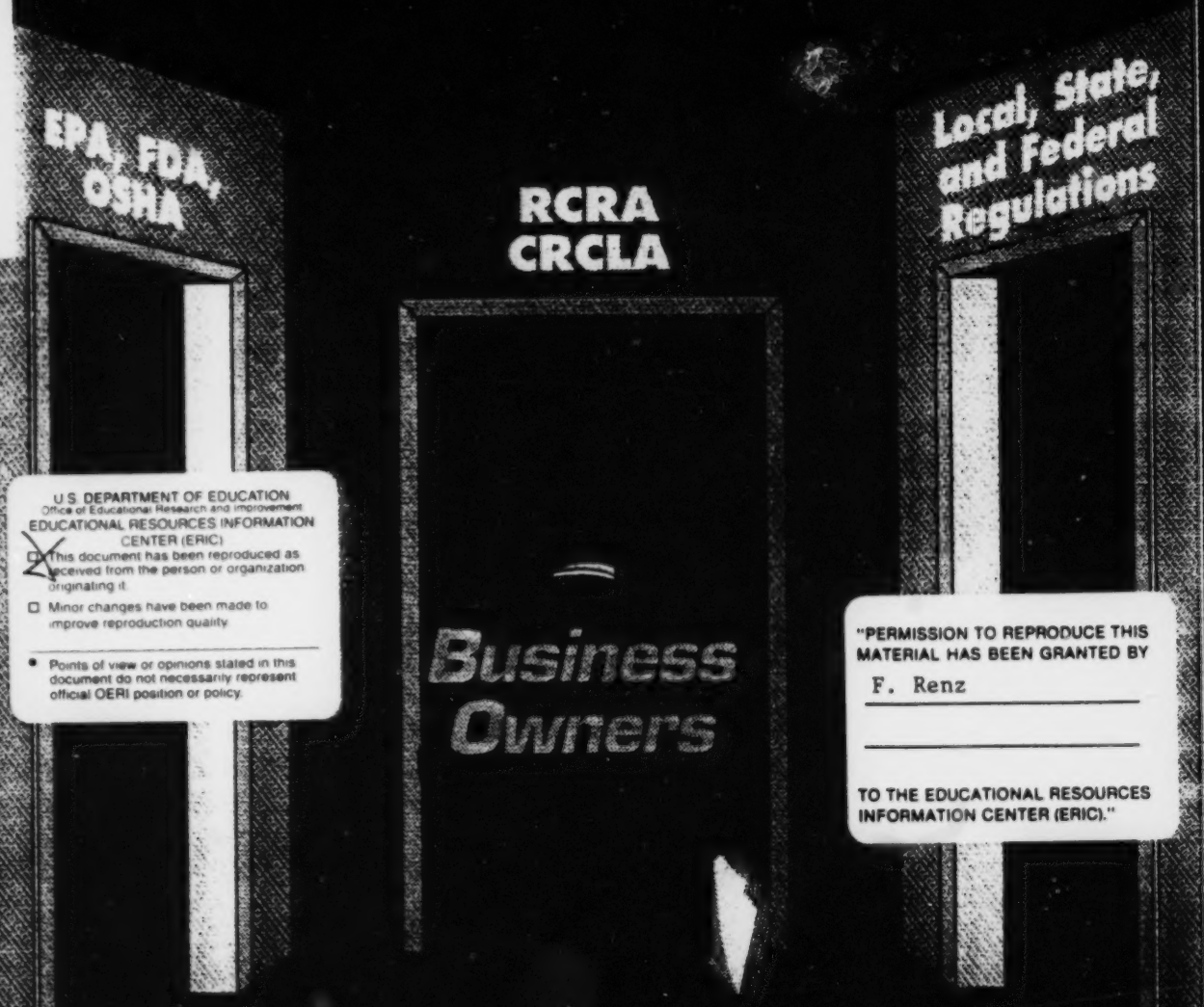

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ECMT^3 I
New Mexico Manufacturing Environmental Survey Final Report

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ECMT^{3}I

NEW MEXICO MANUFACTURING ENVIRONMENTAL SURVEY

FINAL REPORT

September 14, 1993

Printed on recycled paper

ACKNOWLEDGEMENTS

Many people have assisted in the planning and execution of this survey of manufacturers in New Mexico. The ECMT³I Team put in many long hours and we'd like to acknowledge their efforts so thanks to Erich Strebe, STARS Coordinator, Small Business Develop Centers; Frank Renz, Executive Director, New Mexico Council of Independent Colleges; Sheila Ortego, Head of Professional and Technical Studies, Santa Fe Community College; Jeff Weinrich, Los Alamos National Laboratories, Debra Belasich, Sandia National Laboratories; and Bill Harlos, Manufacturing Productivity Center. A special thanks to Jeff Lenhert, Albuquerque office, DOE for his support and encouragement. For help in putting together and participating in the environmental regulator's survey, we'd like to thank John Geddie and the New Mexico Environmental Department staff and Bob Hogrefe with the City of Albuquerque and the city's environmental experts. A special thank-you to all of the manufacturers that took the time out of their busy schedules to fill out the survey and give us feedback. We appreciate the leadership and direction of Robyn Stiefeld, Sandia National Labs.

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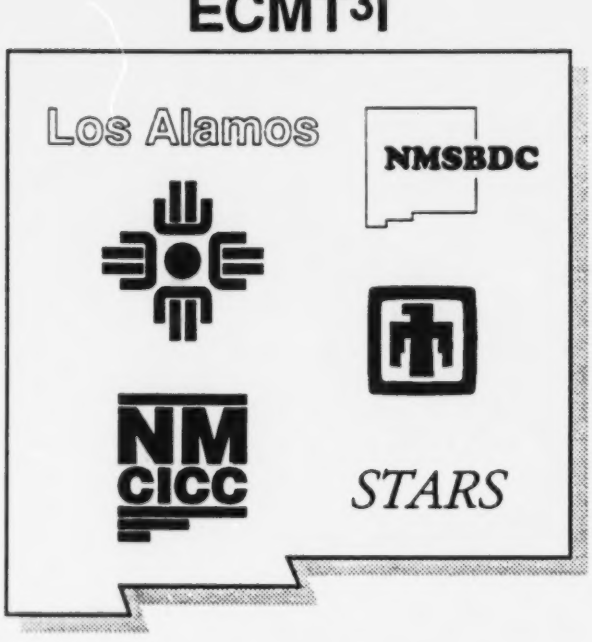
A. THE ECMT³I

The Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT³I) program, sponsored by the United States Department of Energy, Office of Environmental Restoration and Waste Management and executed through Sandia National Laboratories, is charged with the task of performing an analysis of the problems of transferring environmental technologies from the DOE laboratories to small and medium enterprises (SME).



The ECMT³I Working Group

In order to establish an effective technology transfer model, an ECMT³I Working Group of laboratory personnel and assistance providers was established. Participants of the working group represented Sandia National Laboratories, Los Alamos National Laboratories, the Manufacturing Productivity Center, the New Mexico Council of Independent Community Colleges, Santa Fe Community College, the Small Business Development Centers, and the State Resource Assistance Resource System (STARS). The Working Group desired an in-depth understanding of business's attitude about environmental compliance and what techniques they currently used to identify, access, and implement environmental technologies. The working group wished to understand how SMEs transferred technology into their facilities. It was also deemed useful to understand the environmental regulators' perception of the success or failure of business's compliance activities.

B. THE SURVEYS

To identify and analyze environmental concerns, two surveys were conducted. One was submitted to the state's environmental regulators, which included the New Mexico Environmental Division (to cover the state perspective), and the Albuquerque Environmental Health Department, Solid Waste Department, Public Works Department, and Fire Department's Hazardous Waste Response Team (to cover the city perspective).

The second survey was designed to sample New Mexico's manufacturers and private R&D firms. All manufacturing Standard Industrial Classification (SIC) Codes and geographical locations in New Mexico were covered for this survey.

The questionnaires submitted to the regulators and manufacturers were different, although there were many overlapping questions to allow for comparisons between the two.

The information from this survey should be of value to both regulatory personnel and those institutions involved in assistance, training, or technology transfer to small businesses.

One of the striking results of the survey was that of attitude...business owners are not profiteers at the expense of the environment, but are very concerned about any negative effects their manufacturing operations may have on the quality of air, water, and land.

In its initial efforts, the ECMT³I Working Group established hypotheses relating to SME attitudes and behavior relative to environmental compliance. The survey results confirmed these hypotheses and dispelled many old beliefs. The survey results will provide the focus on some characteristics of the manufacturing community which will allow the ECMT³I Working Group to change the emphasis on our assistance programs.

C. SURVEY RESULTS

One of the striking results of the survey was that of attitude—attitude of both the business community and the regulators. For example, questionnaire responses demonstrated that most business owners are not profiteers at the expense of the environment, but are very concerned about any negative effects their manufacturing operations may have on the quality of air, water, and land. Comments on the survey demonstrate that many (especially the larger [greater than 20 employees]) manufacturers understand the underlying purpose of the environmental regulations and are in agreement with them. Most disagreement concerns the way regulations are determined and defined. So, even though the majority of manufacturers want to comply with the regulations, they don't always fully understand them, understand when they are in or out of compliance, or where to get help.

Assistance Providers need to help the SMEs understand required environmental paperwork.

Compliance, to many of these manufacturers, means completing volumes of paperwork, which has nothing to do with being environmentally conscious, and which SMEs can ill afford to keep up with. The huge cost and burden of paperwork is often more expensive and time consuming than the act of obtaining compliance.

Relationships between survey respondents and environmental regulators in New Mexico display little antagonism.

Another result of the survey was the revelation that very little antagonism exists between suvey respondants and regulators. This may be largely a function of the individual personalities, both the regulator's and the business person's. Indeed, local environmental agencies seem to be more interested in working with the manufacturers than policing them.

From the surveys returned from the state environmental division and the various Albuquerque environmental agencies, the regulators understand the issues facing the SMEs and most view themselves as teachers or helpers and not enforcement police. For example, the city of Albuquerque has done an outstanding job of promoting the concept of a partnership between business and regulators.

A company's knowledge of waste, hazardous materials, environmental regulations, pollution prevention, etc. is dependent on company size and geographical location.

The greatest problem in complying with environmental regulations lies with the small business (less than 20 employees); the reason for this difficulty is that the business owner and his staff do not know what regulations apply to them,

which substances are hazardous, and have never been visited by an environmental regulator. As a result, many of these business owners assume they are operating within the law and are in no way out of compliance.

Most companies develop environmental, safety, and health programs using in-house resources.

The survey results show that those companies that seek help in setting up procedures and systems to handle hazardous substances or working conditions mostly seek the expertise of in-house staff. It is not clear where these employees receive their expertise and how they keep up with the frequent changes to regulatory laws. The most popular outside source of help is the company's suppliers. These are generally the ones who, when selling an SME a hazardous substance, provide them with the Material Safety Data Sheets (MSDS)—information on proper use and disposal of the material—and potential chemical substitutes or alternative processes that can be used. The community colleges, universities, and federal labs are not viewed as a source of training, information, or problem solving. This is ironic because these three entities consider themselves vital sources of information for the SMEs to help them grow and prosper.

A set of recommended actions can be deduced from the survey results. The first is to develop an outreach program for the SMEs to help them comply with environmental regulations. This outreach program should be a partnership between the environmental regulators and the assistance providers. Second, the SMEs need help finding the most effective way to deal with the paper work required to document the existence of hazardous materials on their premises. Third, the community colleges, universities, and federal labs must change the way they interact with the SMEs if they wish to act as technical, educational, and training resources for the business community. These resources must market their capabilitities and services the same way any private company would.

The community colleges, universities, and federal labs are not viewed as a source of training, information, or problem solving. This is ironic because these three entities consider themselves vital sources of information for the SMEs.

D. SURVEY OUTLINE

This Survey Report begins with an account of the issues facing small business in the U.S. and the need for effective transfer of technology to them. The background of the ECMT³I program is discussed to provide the reader with the rationale behind the effort. Section II is the Summary of Findings, which includes the survey methodology, the summary of questions from both surveys, and the highlights of the survey results. The analysis of each question, along with the complete results, is detailed in the appendix.

SECTION I
BACKGROUND

A. WHY CONDUCT A SURVEY?

There has been a growing national recognition that SMEs hold the key to economic competitiveness and growth in the United States. However, the success of the SMEs is dependent on their capacity to improve the efficiency and productivity of their operations, and there is growing evidence that this will not be accomplished if left to happen on its own. New Mexico has been developing independent (and disjoint) assistance programs with some success, but they demand improvement. The Department of Energy (DOE) is sponsoring an effort to look at more effective ways to transfer technology from the federal laboratories to the SMEs. This includes examining the business assistance process and applying known process improvement tools to identify areas for redefining the interface between the SMEs and the sources of technology. The first steps in the process improvement methodology are to better understand the issues and to identify and listen to the "customer."

In a 1990 white paper, Industrial Modernization: An American Imperative,[1] the National Coalition for Advanced Manufacturing stated that "to enhance the competitiveness of American industry, the nation must devote increased resources to the dissemination of advanced manufacturing technologies—especially readily available, off-the-shelf technologies—and to provide greater support for emerging critical manufacturing related technologies, particularly process technologies." This statement is but a sample of the mounting support for intervention in the industrial modernization process. To regain our economic competitiveness requires a coordinated effort to raise the level of awareness of the need for and the availability of modern manufacturing technologies and methods for the SMEs.

> *"Training is now recognized as one of the critical factors in improving manufacturing performance and making effective use of technology."*

The key questions are: How well are New Mexico smaller manufacturers able to deal with modernization requirements? And, how can our industries upgrade their production systems, improve products and services, enhance design capability, invest in workforce skills, and develop new customers in the U.S. and foreign countries (especially the twin plants along the U.S. Mexican Border)? The effect of these improvements will be the maintenance of high-wage jobs, the strengthening of NM technological capabilities, the provision of high-quality inputs to other manufacturers, and the contribution of economic strength to the state.

Despite the increasing demands being placed on smaller firms and their growing importance in our state's economy, smaller manufacturers are not using available technologies that would allow them to improve quality, raise productivity, and increase their ability to respond to changing market conditions. There are many New Mexico SMEs with the ability to generate and apply state-of-the-art manufacturing technologies, but unfor-

[1] Industrial Modernization: An American Imperative: The National Coalition for Advanced Manufacturing, Washington, D.C., 1990; Thomas Publishing Co./Thomas Magazine Group.

tunately, there are many more smaller firms which lag behind in their use of modern manufacturing technologies and methods.

Another key question is how to improve workforce training, both nationally and in New Mexico. Smaller manufacturers rarely provide formal training or skill upgrading programs for their workers because of the expense and loss of productivity time. In Modernizing Manufacturing, Philip Shapira states that "smaller manufacturers tend not to participate in public training programs, in part because public training programs are usually not well geared to meet the needs of smaller firms. The lack of training, combined with fewer internal promotion opportunities, means that smaller manufacturers are often unable to develop and retain the skilled labor needed to absorb and effectively operate new manufacturing technologies."

Shapira also says that "training is now recognized as one of the critical factors in improving manufacturing performance and making effective use of technology. This seems to be recognized by the [national and state] programs surveyed, since making a referral to a training source is the fourth most frequently provided type of assistance."

New Mexico has a significant business/manufacturing assistance infrastructure, but there is concern that it is not as effective as it could be and that there is a great need for this system to improve if New Mexico is to become a more competitive economic entity. New Mexico has a large number of assistance organizations and efforts and an enviable source of technology from which to draw. At the same time, however, the impact on the business community has not produced broad-based improvements. There have been isolated cases of excellent results, but the grass-roots business community has remained basically untouched. There is also concern that so many companies enter the *assistance system* only to be bounced from agency to agency until they finally give up in despair.

The State Technology Access Resource System (STARS) program was designed to become a focal point for business assistance in the entire state. This organization would take *ownership* of companies entering the system and track their progress to ensure that they receive the results needed.

The following diagram defines the technology transfer linkages. The icon labeled "Technology" encompasses many sources: private industry, universities, laboratories, etc. Likewise, the intermediary icon has a large number of members: the Manufacturing Productivity Center, the Small Business Development Centers, the Cooperative Extension Services, State Economic Development Department, etc. The direct link between the SMEs and their needed technology does not occur very often; frequently it is the result of someone in the SME organization knowing someone or having some connection inside the source of the technology. Occasionally, an SME will get lucky and establish a contact within the technology source.

In the ideal scenario, the SME goes to an assistance provider, who in turn has connections inside the technology organization and can facilitate communication between the two. The goal of this project is to first understand how the SME meets his technology needs and then identify ways to strengthen the channels of information, cooperation, and assistance between the intermediaries and the SMEs, and the intermediaries and technology sources.

The Technology Transfer Linkages

To accomplish this, Robyn Stiefeld from Sandia National Laboratories gathered together a group of assistance providers from New Mexico to explore improvement in the technology transfer process. Out of the group of exploratory meetings emerged a core of organizations that was committed to achieving success in this effort—the Environmentally Conscious Manufacturing Technology Transfer and Training Initiative (ECMT³I).

Technology transfer to SMEs will be a considerable challenge. Hence, the ECMT³I Working Group decided to limit the scope of the project to environmental technologies to increase the probability of success. It was felt that lessons learned from this project could be easily transferred to other areas.

> The goal of this project is to first understand how the SME meets his technology needs and then identify ways to strengthen the channels of information, cooperation, and assistance between the intermediaries and the SMEs, and the intermediaries and technology sources.

B. SETTING PARAMETERS FOR THE SURVEY

In order to embark on a process improvement strategy, it was imperative that we establish needs and identify critical issues. Part of the analysis was to define environmental issues, both from the SMEs' and environmental regulators' perspectives. This would not only allow us to develop a prioritized list of issues, but determine whether the SMEs and regulators could agree upon what the issues are! The analysis also served as a way to measure the effectiveness of our programs.

SECTION II
SUMMARY OF FINDINGS

A. SURVEY METHODOLOGY

The forms for the two surveys were developed by the ECMT³I working group. Once drafts of the surveys were generated, trial survey instruments were sent out for comments. For the environmental regulators survey, John Geddie, representing the State of New Mexico, and Bob Hogrefe, representing the City of Albuquerque, served as reviewers and commentors for the regulators. After the final form of the survey instrument was determined, the surveys were distributed to city and state regulators through their supervisors. This helped us to achieve a better response rate from these individuals.

For the manufacturers' survey, the New Mexico Manufacturing Productivity Center (NMMPC) sent out 12 sample forms to companies in various SIC codes and asked them to make comments about clarity of the questions, length of the survey, relevance, etc. Eleven of the twelve were returned with excellent comments and suggestions for revisions. Revisions were made according to final responses and the "real" survey instrument was sent out.

The Small and Medium Enterprise (SME) survey was mailed out to 2,249 companies. The mailing list comprised 206 firms listed in the *High Tech New Mexico* directory and 2,043 companies in the *New Mexico Manufacturers* directory provided by NMSU. Forty-eight surveys were returned with no forwarding address, and one hundred surveys were returned, filled out. A significant number of these companies had worked with the Manufacturing Productivity Center (MPC) and were familiar with the organization and their efforts to improve manufacturing in the state. The MPC tried follow-up calls to companies that didn't respond, but found the task overwhelming.

B. SUMMARY OF QUESTIONS ASKED

The following is a summary of the questions asked in the regulators' survey. A copy of the complete survey is in the appendix.

Environmental Regulators' Industry Questionnaire

1. What industries are having problems complying with environmental regulations?

1.1 What Industries are resisting regulations?

1.2 What industries do not know or understand the regulations?

1.3 What industries are facing yet unsolved technical problems in complying with regulations?

1.4 What industries are facing high costs to comply with regulations? (The technology may be there but it is expensive)

2. What industries are facing few or no environmental compliance problems?

3. How do you communicate regulations to private industry? Is it effective?

4. Which of the problems with environmental regulation compliance in industry could be solved by better training of both the work force and management?

5. What changes do you see coming in the next 1 to 2 years that will impact the economic growth of our industrial sector? In the next 5 to 10 years? Are there some areas of environmental concern that are departmental priorities?

The purpose of the questionnaire was to identify the industries that are having problems with the regulations and why. This would provide us with input for a program plan to derive solutions and help us establish priorities.

Most questions for the regulators consisted of making choices over the range of SIC codes. For the manufacturers, the questions were primarily multiple choice with ample space for comments. The following is a summary of the questions for the manufacturers. (Note: Questions 1 through 3 related to name of company, size, type of business, etc.)

Manufacturer's Survey Questionnaire

4. Do you have any hazardous materials on your premises?
5. Do any of your processes represent a potential threat to the health or safety of your employees?
6. How do you receive information on present and future regulations that will impact your business?
7. Do you have problems complying with the regulations?
8. Do you believe the environmental regulations with which you must comply are necessary?
9. Do you receive visits from regulators in your facility?
10. What kind of relationship do you have with regulatory agencies?
11. Where do you find solutions to environmental problems?
12. How does your company provide for or support employee regulation awareness training or skill development training?
13. How have you developed internal operating standards and practices for handling non-hazardous waste and hazardous waste materials and reducing and treating solid and hazardous waste?
14. Does your company have an energy minimization program?
15. How does your company reduce the use of high risk materials or lessen the environmental impact of manufacturing processes?
16. Does you company have employee health and safety standards as a part of company policy?
17. How does your company reduce the use of high risk materials or lessen the environmental impact of manufacturing processes?
18. Does your company need help with compliance reporting requirements, audits, or external performance reporting?
19. What do you see in the way of compliance issues in the next 2 to 5 years that will impact your business?
20. What do you see in the way of compliance issues in the next 5 to 10 years that will impact your business?
21. How could the resources available to you be best structured to support you in your efforts to comply with environmental regulations?

C. SUMMARY OF REGULATORS' SURVEY RESULTS

The purpose of the summary of findings was not to focus regulators' attention on the culprits, but to provide information on how to assist at-risk industries.

Due to the division of areas of responsibility (some regulators are just concerned with water, some just air quality, etc.) and the fact that some

regulators are responsible for a specific geographical area of the state, the results provided us with a rich variety of responses. For example, an industry that emits large quantities of volatile organic compounds (VOCs) but does not have any problems with its liquid waste stream will be perceived as a problem industry from an air quality standard, but a clean industry from a waste water standard. Environmental deficiencies also seem to be regional in several instances; the mining and dairy industries are problem areas in the southeast quadrant of the state, but not as much of an issue in the city of Albuquerque. Certain types of electroplating are a problem in Albuquerque, but nowhere else in the state.

Out of the 44 SICs listed, we will examine the top 11 to determine which industries, from the regulators' point of view, are at risk. Figure II-1 shows the ranking of the 11 (due to a tie for the tenth slot) industries. Since this is a combination of all the questions, this determines who is having overall environmental problems, who is resisting regulations, who doesn't know the regulations, and for whom the environmental solutions are too expensive or technically not feasible. The details of the analysis of the regulator's survey are in the appendix.

Questions 1 through 1.4 of the environmental regulators survey provided three possible responses: Major Problems, Minor Problems, or No Response. What constitutes major, minor, or absence of problems was a subjective call on the part of the regulator. To get a sense of which industries drew the most attention overall, the major and minor responses were totalled for the five questions.

1. Chemicals and Gases
2. Asphalt Products
3. Paints and Finishes
4. Jewelry
5. Mining
6. Refining
7. Circuit Boards
8. Dairies
9. Logging, Sawmills
10. Printing
11. Agricultural Chemicals

Figure II-1. Industries With Most Environmental Issues

D. SUMMARY OF MANUFACTURERS' SURVEY RESULTS

The Working Group hypothesized that the survey results would be affected by the company's size, geographical location, and type of industry. The survey results were "sorted" by these three decriminators.

To study the results as a function of size, the responses were divided up into groups of companies employing from (a) 1 to 19 (small), (b) 20 to 49 (medium), and (c) 50 or more employees (large). According to the *New Mexico Manufacturing Directory*, this grouping provides a distribution as illustrated in Figure II-2a. However, the returns gave us the distribution graphed in Figure II-2b. As can be seen, the distribution is shifted toward the larger companies, which doesn't provide us with the representative sample we had hoped for.

Conversely, the distribution for companies in and outside of the Albuquerque metroplex fell very close to the actual state distribution, as illustrated in Figure II-3.

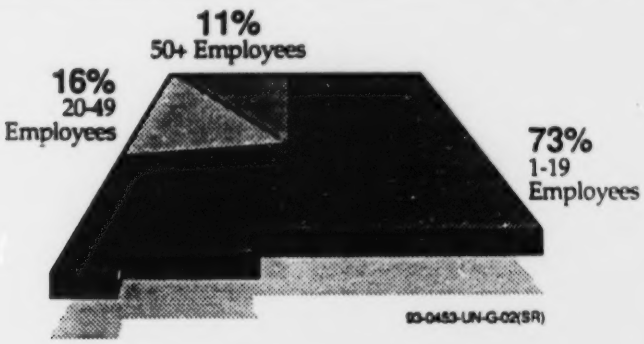


Figure II-2a. New Mexico Manufacturer Size Distribution

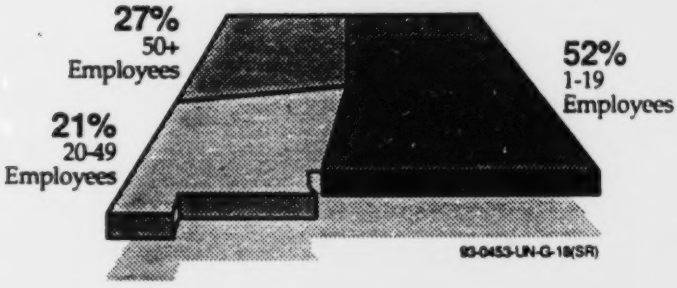


Figure II-2b. Survey Response Distribution as a Function of Size

As expected, company size is a critical factor in how a manufacturer deals with environmental concerns. First, as much as 63% of the small companies claimed that they are never visited by an environmental regulator, while only 4% of the large firms made the same claim. When asked if they had any hazardous chemicals on their premises, 48% of the small companies said no, but 93% of the large companies said yes. When asked if they were having problems complying with regulations, 48% of the small companies said no, that compliance was straightforward. Only 33% of the large companies felt the same way. Twenty-one percent of the small companies stated that regulatory compliance wasn't applicable to them, while only 4% of the large companies made the same claim. It appears to be a fair assumption that most smaller companies do not understand or know about the regulations to which they are bound and do not know which substances have the potential for environmental degradation. It appears that they are never or are rarely visited by environmental regulators, so are never made aware that they may be out of compliance. And yet, when asked if environmental regulations are necessary, many small company owners expressed more support than large companies.

Question 11 asked where SMEs typically obtained solutions to environmental problems. As might be expected from the aforementioned data, 25% of the smaller companies said this question didn't apply to them, while none of the larger companies checked that response option. Only 13% of the small companies said they found solutions at seminars, while 56% of the large manufacturers used this as a source of solutions. Anyone who has tried to run seminars for small business knows how challenging it is to garner any interest or participation.

It appears to be a fair assumption that most smaller companies do not understand or know about the regulations to which they are bound and do not know which substances have the potential for environmental degradation.

Companies were also asked about the development of or provision for environmental training, materials handling standards, energy minimization programs, pollution control programs, employee health and safety standards, and the reduction of personnel risk because of contact with

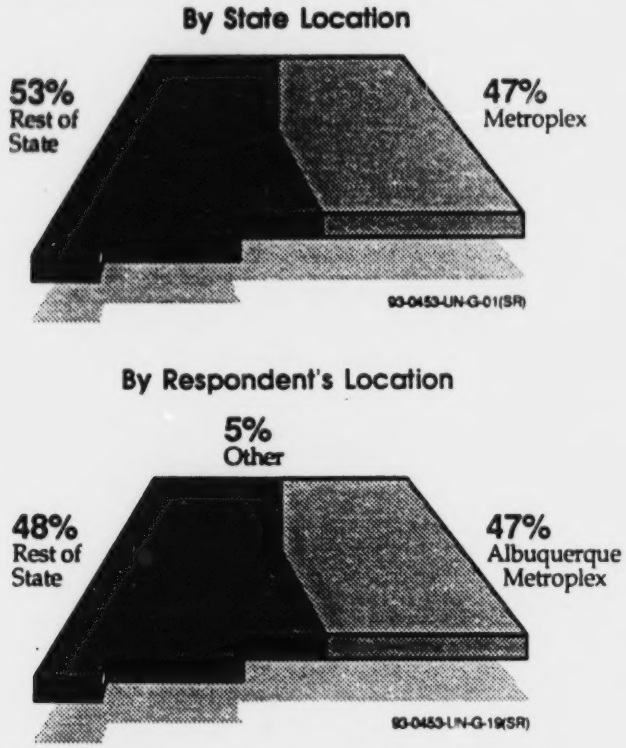


Figure II-3. Distribution by Location

materials/processes. The table below illustrates the percentage of companies that said these operating standards were not applicable or were not an issue.

The survey data were analyzed from the viewpoint of the company's location. When asked if the manufacturer had any hazardous materials on his premises, 71% of the companies in the Albuquerque metroplex said yes, but only 46% outside the metroplex gave an affirmative answer. A similar question asking whether any of the manufacturing processes represented a potential threat to the health and safety of the business's employees provided a 46% yes from metroplex companies and 26% yes for the rest of the state. One might conclude that industries with a high environmental risk are primarily in the metroplex; however, responses to Question 6 pose another possibility. When asked how manufacturers receive information on present and future regulations that will impact their businesses, metroplex companies checked off available choices at a 10- to 15-% higher level than their non-metroplex counterparts. This seems to indicate that rural New Mexico companies have a difficult time obtaining access to information on regulations.

Responses to Question 9, which asks how often a company is visited by environmental regulators, relates to rural manufacturers' problems. The frequency of visits by a regulator in the metroplex runs two to three times that of a rural company's visits. Forty-two percent of the rural companies are never visited, while only 31% of manufacturers in the metroplex are never visited. This is significant because most environmental regulators "instruct and enlighten" rather than

Survey Results

Response: Not Applicable or Not an Issue

	Company Size		
	Small	Medium	Large
Where do you find solutions to environmental regulation problems?	25%	19%	0%
Environmental Training?	21%	14%	0%
Materials Handling Standards?	13%	10%	0%
Energy Minimization Program?	63%	38%	19%
Pollution Control Program?	58%	19%	26%
Employee H & S Standards?	27%	0%	0%
Reduce Risk of Materials/Processes?	44%	19%	15%

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"police and inform." Therefore, if regulators are not making visits, businesses are not getting the benefits of education on environmental regulations they need for compliance.

Again, the issue of how a company develops policies toward working with hazardous materials, energy conservation, and worker health and safety seems to be a geographical issue. The table below shows the relative frequency of responses between metroplex and non-metroplex companies that felt that various issues did not apply to them.

This analysis shows how disadvantaged the rural manufacturer is in New Mexico. We recommend that options be re-investigated to assist these companies in their attempts to access technology, information, and problem solving resources.

The data were also analyzed by SIC code. As expected, the question of whether the company has difficulty complying with environmental regulations is very industry dependent. This question also matches the questionnaire provided to the state regulators. The first choice for the industry survey on this question was, "Yes [they have problems complying because] the cost of compliance is too high." The responses from the manufacturers were almost directly opposite to those provided by the regulators. Companies that listed cost as an issue were not listed as having cost-related regulatory compliance issues by the environmental regulators and vice versa. On the other hand, both industry spokesman and regulators agreed that technology availability was generally not an issue.

In answer to the question of the frequency of visits by environmental regulatory personnel, the response was that close to 50% of the companies never saw a regulator except for the stone, clay, and glass industries, three-fourths of which said they had never seen a regulator, and the food and furniture industries, which almost always see them.

Survey Results

Response: Not Applicable or Not an Issue

	Company Location	
	Metro	Non-Metro
Where do you find solutions to environmental regulation problems?	19%	20%
Environmental Training?	10%	22%
Materials Handling Standards?	6%	14%
Energy Minimization Program?	38%	54%
Pollution Control Program?	54%	58%
Employee H & S Standards?	10%	20%
Reduce Risk of Materials/Processes?	25%	42%

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SECTION III
CONCLUSIONS

Conclusion 1

A company's knowledge of waste, hazardous materials, environmental regulations, pollution prevention, etc. is dependent on company size and geographical location. For example, companies with fewer than 20 employees tend to know less than larger firms about hazardous materials that may be on their premises. The same is true for rural manufacturers. Smaller firms and rural companies tend to feel that programs such as employee health and safety, energy minimization, pollution control, employee training in environmental safety, etc. either do not apply to them or are not important company strategies. This shows the importance of developing a program aimed at raising the awareness of small manufacturers about the importance of a long-term strategy for improved internal and external environmental standards.

Impact

The impact on small companies, incorporating the above strategies as part of their business operations, would be: (1) Greater business stability due to reduction of risk of non-compliance, (2) Lower insurance rates, worker comp rates, etc. due to better control over hazardous and toxic materials, (3) Marketing potential for environmentally conscious programs, (4) Source reduction, which means less strain on meeting Environmental Protection Agency (EPA) Standards for community air and water (5) Increased economic competitiveness.

Conclusion 2

Relationships between survey respondents and the environmental regulators in New Mexico are not antagonistic. Businesses that are trying to comply with the regulations find the regulatory personnel to be helpful—they suggest changes or additional resources to help the typical business person. The best example of this is the Waste Water Treatment Division in the City of Albuquerque. Their program concentrates on source control and voluntary compliance with the division's efforts to provide the small manufacturer with process waste assessment tools and extensive lists of free resources to help the manufacturer with problem solutions.

Impact

The impact on the SME is that the regulator becomes another resource to help the small business owner run a more profitable business by avoiding high costs associated with purchase, handling, and disposing of hazardous material or by implementing waste minimization practices.

Conclusion 3

Regulators are over-worked and can't even begin to cover the business community. Regulators responsible for rural New Mexico have large distances to cover, which prevents them from adequately covering their designated area. Metroplex regulators have large numbers of businesses to cover and must ignore the smaller companies.

Impact

The impact for New Mexico is that partnering with other regulatory agencies and with assistance providers will extend the reach of the regulators into the small manufacturers to raise their awareness of the rewards of environmental compliance.

Conclusion 4

There should be more integration between the efforts of the environmental regulators and the assistance providers. If the regulators could communicate compliance problems to their local assistance providers, they could work as a team to help the business become compliant, which would provide some relief to the regulator's busy schedule.

Impact

The impact is the same as for Conclusion 3.

Conclusion 5

Enough companies expressed an interest in getting help with reporting that the assistance providers network needs to develop a program to provide that type of assistance. This could be a good prototype exercise to verify the tech transfer model developed by the ECMT^{3}I Working Group.

Impact

The impact for the SME will be less time spent on paperwork and a clearer understanding of the overall purpose of the regulation and its associated paperwork. The impact for ECMT^{3}I *is an opportunity to verify the Technology Transfer Model developed by that group.*

Conclusion 6

Many of the questions sought answers on where manufacturers can seek help in developing programs relating to environmental, safety, and health issues. The largest overall response was the use of in-house expertise. However, there is no clue as to where the in-house expertise would originate. The next greatest response involved receiving help from vendors. The least popular source of information was the colleges, universities, and federal laboratories, which in fact can be excellent sources of knowledge and information. If those entities see themselves as tech transfer agents or small business assistance providers, then they are facing some serious marketing requirements. Small business is not going to pursue an organization with the latest, greatest, or most wonderful ideas or technologies. The small business person must be sold on the idea that an assistance provider will not waste their time, but will provide them with top quality help in a reasonable amount of time and in an effective and efficient manner. The survey response indicates that the majority of the small business owners do not feel that way about the 2-year schools, universities, and labs.

The survey results also show that any organization that has tech transfer or assistance as its charter must expend some energy determining the best way to communicate with small business and developing a marketing plan to "sell" their capabilities and the real issues facing business. The assistance providers must also make the effort and take the time to develop client-centered assistance and learning. Client-centered means that the medium of communication between the business and the provider be tailored to the learners' ability level and environment. This is important, because too many times, course development is centered on the technology or material to be taught or transferred, and the presentation is delivered by the teacher or assistance provider. The receiver of the technology or information is asked to conform to the curriculum and the presentation style, and try to apply what he/she has heard to his/her particular environment. The fact that the business owners do not look to traditional education and training institutions for help is a good indication that business owner's needs are not being met.

Impact

Assistance providers and educational institutions need new paradigms for interacting with small business. Classroom style teaching, seminars, trade magazine articles, etc. are not meeting client's needs. Educators, trainers, and assistance providers need to break out of the old paradigms and develop new methods for relaying information. This will take some effort, but it is necessary if we are to advance our small businesses here in New Mexico.

What's Next?

Following the completion of the survey, the question arises, where do we go from here? The Working Group has three primary recommendations: implementation of pilot projects, verification of the model, and expanding the scope of the project.

Pilot Projects:

1) STARS Expansion: All of the feedback received by the Working Group indicates a need for an easier system from which small business can receive help. The two elements that can have the greatest impact on that need are training and a better communication network between assistance providers. Training is needed for the organizations that are to be in direct contact with the SMEs to improve their ability to perform intake interviews, to ask the right questions, and to understand the resources available to them.

The network expansion involves creation of electronic links between the assistance providers and a common database for tracking the clients.

2) City Waste Water Treatment Plant Study: The SMEs have identified scientific and research studies as an area where SNL and LANL can add the most value. SNL has been requested to perform a study to determine the economic impact of the new silver regulations that are coming through the EPA. The study will cover new technologies to bring silver users into compliance through the application of technology or substitution of materials in processes.

3) Native American Health Issues: This project started with the examination of the health issues associated with the making of silver jewely and quicky spread to the making and firing of ceremic pottery. This project will allow the Department of Energy to participate in solutions to very important environmental health issues that have a great impact on the economic livelihood of a significant part of the New Mexico population.

Process Waste Assessment: The ECMT^{3}I working group combined forces with AMPEC to develop and present train-the-trainer programs to the community colleges, SBDC, and cooperative extension services. This project has just started and needs to be supported for further development.

Verifying the Model:

The technology transfer process model (see the ECMT^{3}I Working Group Report on the process model) needs to be verifyed through pilot projects and operations procedures studies. Most of the aforementioned pilot projects incorporate some of the procedures described in the model. The results of these pilot projects need to be studied, along with the processes used during their implementation. With differences between the model and the actual processes identified, either the model can be improved or the processes used in the pilot improved.

APPENDIX A
RESULTS FROM THE VIEWPOINT OF THE ENVIRONMENTAL REGULATORS

APPENDIX A
RESULTS FROM THE VIEWPOINT OF THE ENVIRONMENTAL REGULATORS

The following is a detailed analysis of each question's response by the environmental regulators. The first five questions had the same format. The regulator was asked to identify those industries that have major and minor problems with environmental regulations. The assumption is that those industry sectors that were not checked are not having problems related to the specific questions.

Understanding the Graphs/Responses

The analysis of each question begins with a bar graph showing the distribution of the industries identified as having major and minor compliance problems. The back row of the graph shows the sum of the major and minor responses. The middle row is the number of regulators that felt that the industries had minor problems, and the front row is the number of responses indicating an industry with major environmental compliance problems. Following the identification of the industries is a multiple choice question, which helps to identify the reasons for the compliance problems.

The first question on the regulators survey is a general one, which sets the tone for the rest of the survey. It asks "What industries are having problems complying with environmental regulations?" Figure A-1 displays the responses for the 12 industries which received the most responses. While the asphalt products industry had the most total responses, the refining and mining industries are clear leaders with respect to major problems.

It is interesting to note who is not on the list. The metal finishing industry, considered by many to be a particularly environmentally troublesome industry is conspicuously absent. A city of Albuquerque regulator commented, "Metal finishers have had problems in the past with compliance, but most are genuinely making an effort. Jewelers (manufacturers) are usually guilty of ignorance—especially smaller companies—of rules and regulations which govern discharges from their operations. Historically, circuit board manufacturers have, in specific incidents, been primary problems for the [water] pretreatment program."

As would be expected, the state environmental department regulators had a much higher response to the refining and mining industries' problems than the city of Albuquerque.

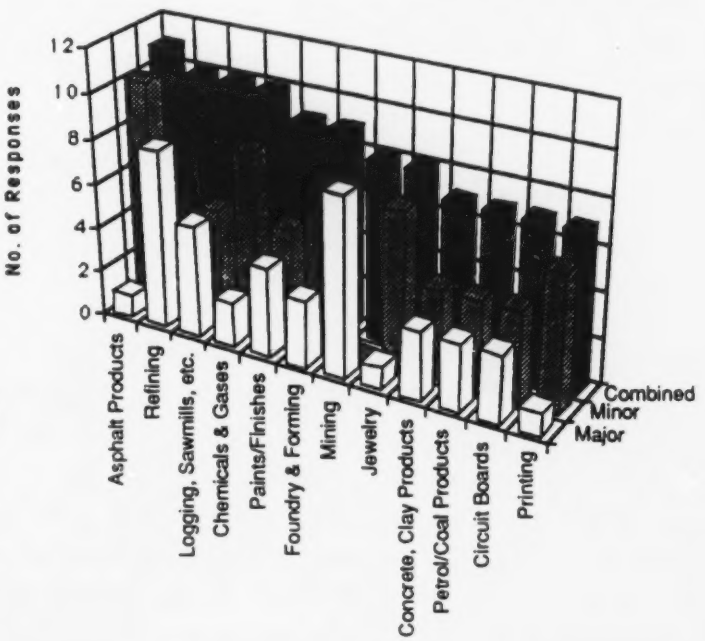

Figure A-1. Question 1: Environmental Problems

If the reader will refer to the survey in this appendix, he will find at least one multiple choice question at the end of the industries' SIC Code list. Instructions to respondents requested multiple answers where it was applicable. Figure A-2 provides the number of responses to Question 1.

What evidence do you have to support this?	Responses
Audit Records show large number of companies are frequently out of compliance	3
Records show a large number of complaints on individual companies	7
Regulators have an undocumented sense of serious problems	7
Industrial processes work with very toxic chemicals	7
The industries has a bad attitude about compliance	5
Solutions to environmental problems are too costly	7

Figure A-2. Responses for Multiple Choice Question 1

The next question asked "What industries are resisting regulations?" The purpose of this question was to identify those industries that feel that they are being unfairly treated in the regulations and to re-examine those regulations or identify those industries that need better education on the negative effects of their manufacturing practices on the environment. Figure A.-3 displays the nine leading industries in resisting environmental regulations from the environmental departments' point of view. Mining, sawmills, and the dairy industry appear to have the most resistance, with the state Environmental Department (ED) providing the majority of the responses.

A state regulator commented, "Many local facilities in general feel there is plenty of air, land, etc. and that it can't be damaged—the old solution to pollution is dilution idea. Some companies resist regulations by only paying 'lip service' to some regulatory requirements." A City of Albuquerque regulator said that, "With newer proposed limits on some specific parameters proposed by the EPA, many jewelers and photographic shops are organizing legal resistance." If any proposed new regulations do not meet some standard based on good science or common sense, we may see more of this type of organized resistance. As businesses get smarter and more organized, they will not stand for arbitrarily mandated regulations.

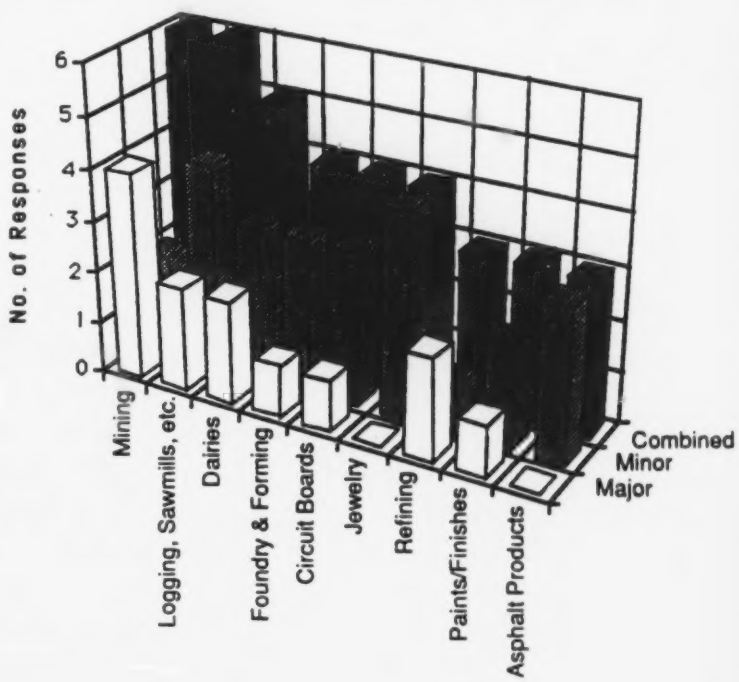

Figure A-3. Question 1.1: Resisting Regulations

Another Albuquerque regulator sees the resistance as a function of time and knowledge: "Most businesses are time limited to look very deeply into regulatory programs of compliance requirement. Information overload is a problem with a myriad of new regulations and rules."

For Question 1.1, there were two multiple-choice questions. The first one is in Figure A-4 and the second in Figure A-5.

Question 1.2, "What industries do not know or understand the regulations?" was specifically aimed at identifying those industries with compliance problems that emanated from ignorance of the regulations. The intent was to use this information to begin an awareness campaign to help the entire industry cope with the ramifications of the law. Figure A-6 illustrates the distribution of the responses by the regulators.

The results tell us that the jewelry industry has minor problems understanding the regulations, but no one seems to believe that it is a serious issue. It is interesting that the regulators also feel that the jewelry industry is resisting compliance with regulations. This would indicate that either the resistance is from lack of understanding or that the lack of understanding comes from the resistance. For example, the regulators see the jewelers as feeling that the regulations are unfair and unreasonable—that they are frustrated with a lack of solutions and feel that others pollute much more than they do. It would appear that this resistance is partially the reason for this industry's lack of understanding.

What evidence do you have to support this?	Responses
Audit Records show large number of companies are frequently out of compliance	4
Recoras show a large number of complaints on individual companies	7
Regulators have an undocumented sense of serious problems	6
Industrial processes work with very toxic chemicals	2
The industries have a bad attitude about compliance	3
Solutions to environmental problems are too costly	3

Figure A-4. Responses for First of Two Multiple-Choice Questions for Question 1.1

Do you know what the reason is for the resistance?	Responses
Business Owners consider the regulations unfair and unreasonable	10
Business Owners are frustrated with the lack of solutions	6
Business Owners feel the solutions are cost prohibitive	11
Business Owners feel that everyone else pollutes much more than they do	6
Business Owners are afraid regulators are "out to get them"	5
Business Owners are concerned that regulations are stricter than normal conditions (tap water, outside air, etc. are out of compliance) so, "why bother?"	5

Figure A-5. Responses for Second of Two Multiple-Choice Questions for Question 1.1

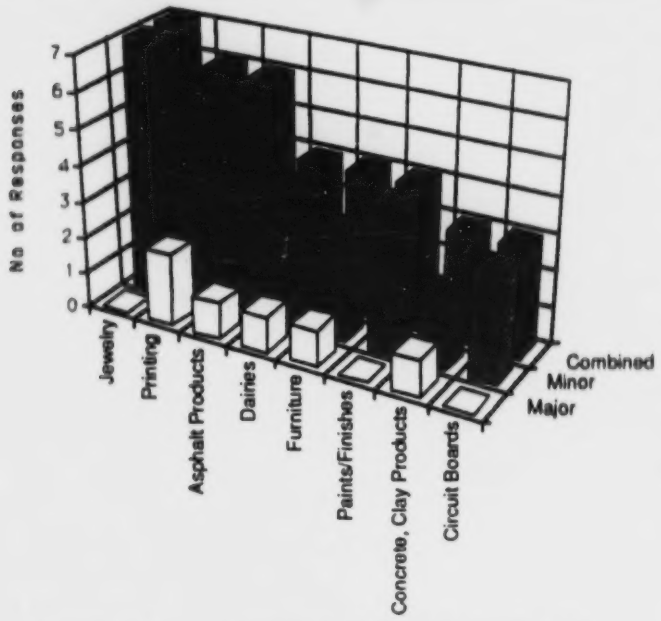

Figure A-6. Question 1.2: Not Aware of Regulations

The data also tells us that the printing industry does not understand how the regulations affect them. Most lay-people don't think of the printing industry as being a polluter.

The fact that other industries fall into both lists (resisting and not understanding regulations) is perplexing, and one must assume that the solution is better education and awareness training. Also, it was not surprising that the state regulators cited the dairy industry as having an awareness problem (which the city didn't mention), and that the city regulators focused on the circuit board industry, which the state regulators didn't mention.

Part of the issue is the way the regulations are written. One state regulator said that, "Drinking water regulations are uncommonly complex...[they] should have been less complex initially as compiled by the EPA."

Regulators feel that most of the problems are with the smaller businesses. One regulator commented that, "Many of the small businesses: (1) Do not know what the requirements are, (2) cannot afford compliance, (3) do not care, and (4) are not afraid of enforcement. Another issue is education and training. "Companies generally do not hire or train individuals in environmental regulations. As such, employees, low-level management, etc. tend to adopt the general idea that regulations are bad for the working men or women." Promoting understanding of environmental issues is not just the job of the regulators. "Once a company sells a chemical to the end business consumer, they provide no technical expertise on environmental issues nor do they care if the end users are in compliance with laws governing the use of hazardous materials.

The answers to Question 1.2's two questions are provided in Figures A-7 and A-8. The second question is interesting in that the two largest re-

What evidence do you have to support this?	Responses
Audit Records show large number of companies are frequently out of compliance	2
Records show a large number of complaints on individual companies	4
Regulators have an undocumented sense of serious problems	7
Industrial processes work with very toxic chemicals	0
The industries have a bad attitude about compliance	1
Solutions to environmental problems are too costly	2

Figure A-7. Responses for First of Two Multiple Choice Questions for Question 1.2

Why is there difficulty in communicating the regulations to some companies?	Responses
The companies are too small and too numerous to visit	9
The language in the regulations is too general, small company owners can't interpret it	10
The most effective and efficient communication medium to each industry not known	6
There is a lack of technical background by the business owners	10
Businesses are dispersed geographically, making it difficult to get them together	7
Business owners are too busy to deal with environmental regulations	5

Figure A-8. Responses for Second of Two Multiple-Choice Questions for Question 1.2

sponses deal with communication. This may open up some possibilities between the environmental regulators and the 2-year schools to address the communication issues. It is also interesting to note that the regulators don't necessarily feel that the small business owners are too busy to bother, but that they just don't understand.

Question 1.3, "What industries are facing yet unsolved technical problems in complying with regulations?" was intended to assist us in identifying industry sectors that need technical help now. As can be seen in Figure A-9, this question had a very low response rate, which means that regulators don't think that available technology is the issue or that they don't know if lack of technology is a factor.

The chemical industry leads the pack, having three out of the top five positions. Mining and circuit boards fill out the remaining for the top five. The state regulators showed much more concern over the technology issues than the city regulators.

Figures A-10 and A-11 provide the results for the two multiple-choice options for Question 1.3.

The high response rate for the last choice, that technologies are not well known, again offers an opportunity for the service providers, especially the community colleges. There is a need to be able to get information out to the small businesses, not only concerning the impact of regulations, but some of the technical solutions as well.

Question 1.4, "What industries are facing high costs to comply with regulations?" is related to 1.3. If the cost to get into compliance is too high, it has the same effect as not having the technol-

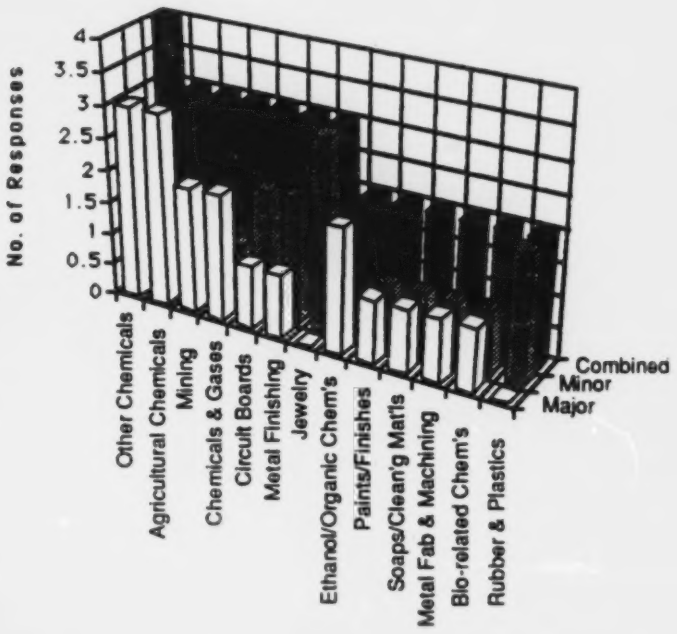

Figure A-9. Question 1.3: Unsolved Technical Problems

What evidence do you have to support this?	Responses
Audit Records show large number of companies are frequently out of compliance	1
Records show a large number of complaints on individual companies	2
Regulators have an undocumented sense of serious problems	3
Industrial processes work with very toxic chemicals	2
The industries have a bad attitude about compliance	0
Solutions to environmental problems are too costly	2

Figure A-10. Responses for First of Two Multiple-Choice Questions for Question 1.3

What is the nature of the required technologies?	Responses
The technologies are very expensive	5
The technologies exist only in laboratory settings	2
The technologies do not exist	2
The technologies are too complex.	2
The technologies are not well known	7

Figure A-11. Responses for Second of Two Multiple-Choice Questions for Question 1.3

ogy available. Clearly, the regulators concurred with this assumption, as can be see in Figure A-12. The top eleven industries (with the exception of dairy) are all related to the chemical sector. There is considerable opportunity here for research. The reasons given by the regulators for the high cost of compliance are provided in Figure A-13.

Question 2 asks the regulators to identify those industries that are having relatively few environmental problems. It was hoped that this list would yield a disjointed set of industries which, for the most part, it did. Eighteen percent of the individuals filling out the survey at some point listed industries as having major or minor problems and also as having few or no problems. Four of the industries listed in the top ten as not having problems are listed in the top ten of one of the questions identifying compliance issues. Figure A-14 illustrates the top choices of those industries with few or no environmental regulation issues. The two multiple-choice questions of Question 2 are depicted in Figures A-15 and A-16.

Question 3 dealt with the communication issue. Most regulators felt that face-to-face was the most effective. Figure A-17 reprints the question with the number of responses.

Several of the respondents offered suggestions for better communication. The suggestions seemed to center on education and the use of people with technical background. One state regulator expressed that there is a need for "more direct contact with facilities by people who understand a variety of processes and technical fields. Both regulators and business people need to "draw upon the knowledge of specialists in each area if needed." Another state regulator suggested a need for an outreach program to educate industry workers and owners. Another suggested that the "regulatory function be 60% educational."

An Albuquerque regulator felt that use of trade associations would be effective, but that at this point the trade associations needed to be strengthened.

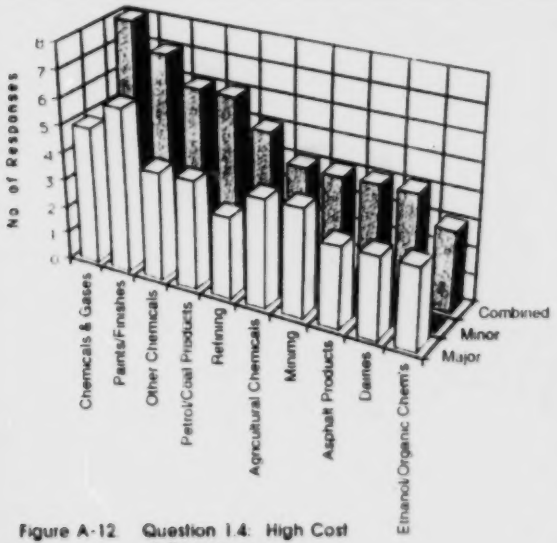

Figure A-12. Question 1.4: High Cost of Compliance

What evidence do you have to support this?	Responses
Audit Records show large number of companies are frequently out of compliance	2
Records show a large number of complaints on individual companies	1
Regulators have an undocumented sense of serious problems	5
Industrial processes work with very toxic chemicals	3
The industries has a bad attitude about compliance	1
Solutions to environmental problems are too costly	4

Figure A-13. Responses for Multiple Choice Question 1.4

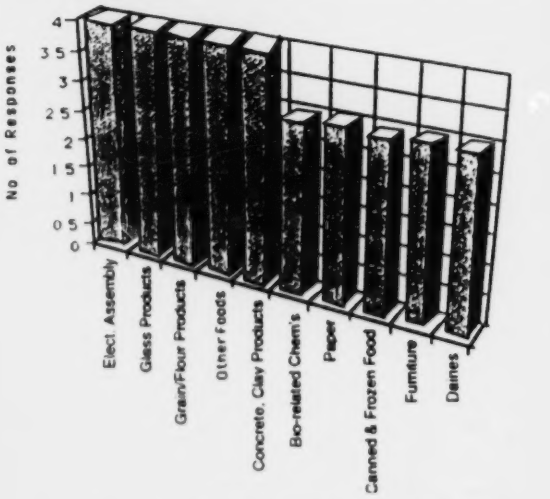

Figure A-14. Question 2: Industries with Few Environmental Problems

What evidence do you have to support this?	Responses
Audit Records show large number of companies are frequently out of compliance	0
Records show a large number of complaints on individual companies	0
Regulators have an undocumented sense of serious problems	5
Industrial processes work with very toxic chemicals	0
The industries have a bad attitude about compliance	0
Solutions to environmental problems are too costly	0

Figure A-15. Responses for First of Two Multiple-Choice Questions for Question 2

Why, in your opinion, are they not having compliance problems?	Responses
The industries have little or no waste	5
The industries have waste, but it does not contain regulated substances	6
The industries have a high level of environmental awareness and most companies are within compliance	5
Solutions to compliance issues are well known and available commercially	8
Regulators are uninformed of compliance/ non-compliance of industries	2

Figure A-16. Responses for Second of Two Multiple-Choice Questions for Question 2

How do you communicate regulations to private industry?	Responses
Mass mailings of bulletins and other information	8
Personal contact through regulators	17
Meetings with industry groups and associations	16
Present communication links are ineffective	2
Is it effective?	
Yes	13
No	1

Figure A-17. Responses to Multiple Choice Question 3

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Question 4 addressed the problem of education and training specifically. There was general agreement that if there is going to be any progress in this area, that a better system of educating the workforce and management is mandatory. Several suggestions surfaced on several respondents' surveys: (1) basic workforce training on handling materials and emergency procedures, (2) basic training on the regulations and their interpretation, (3) upper and middle management training, and (4) education of cost effectiveness. There was also a suggestion that a "one stop shop" capability be available for helping small businesses deal with environmental issues. One individual claimed that what prevented progress in this area was lack of funds. The ECMT³I working group would like to suggest that if the environmental departments partner with other organizations (like the community colleges, SBDCs, universities, etc., with backing from technical resources), they may be able to share the burden of this task of educating the business community. While this attitude is finding some advocates in environmental departments, progress is slow and needs to be accelerated.

Question 5 asked the regulators to speculate on will happen in the area of environmental regulation that will have an economic impact in the next 5 years. There was unanimous agreement that it will only get more and more difficult and more expensive to comply. The increasing stringency in regulations will be felt in ground water contamination, with lower threshold limits of several hazardous materials, and new regulations will inflict expensive storage requirements on small generators. There will also be tougher regulations on the transportation and storage of hazardous waste. The drinking water supply program and the Clean Air Act regulations will increase in difficulty, as will the type and quantity of facilities affected. As an example of tougher regulations, by 1998, all underground storage tanks will have to meet the new, tougher standards. It is estimated that these standards will cause 25% of New Mexico facilities to close.

Environmental-related costs will continue to climb. Costs associated with prevention, while a burden on small companies, will still offer a better financial deal than remediation or disposal. The cost of cleanup will affect everyone, from the generator to the municipal waste water treatment facility. Landfill costs will continue to rise, especially in high population density areas where available land is scarce. As regulations get tougher, more companies will have to look at closed loop systems that will recirculate both treated air and water within their facilities. Manufacturers will see costs increase directly through new fees associated with Clean Air Act Amendment Titles II and V.

Regulators also see a much stronger effort to consider the effects of new regulations on economic development. Also, as mentioned before, regulators see enhanced education and training as their most effective tool for helping more companies reach compliance.

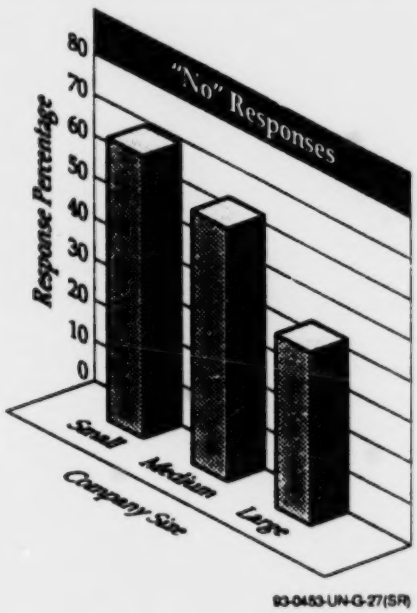

Figure B-2.

the health and safety of the employees. New Mexico has a serious problem with workers compensation insurance, and these figures shed some light on part of the problem. Fortunately, corrective measures are being taken to reverse this trend. The education and assistance of small and rural companies on worker heath and safety issues is the charter of a consortium of agencies and organizations that are concerned about these issues. It is called the "Safety Resource Council" and can be contacted at 505-268-1899.

The following is a sample of the health and safety responses we received:

- Wave solder operators are typically exposed to lead; danger of inhalation of lead fumes; and potential transfer of lead by inhalation/ ingestion/contact.
- Machinery, heavy equipment, moving machine parts, steam, electricity, (including high-voltage), work near or with wood cutting machines (there is always a potential accident around moving equipment; danger only exists if safety precautions are not met)
- Chemicals, potential cyanide exposure, solvent exposure, metals poisoning, resin (a suspected carcinogen), plating bath chemistry, ELO (explosive, flammable, poison, OSHA PEL), painting materials, hot melt adhesive, welding fumes, hot melt adhesive, air-borne solvents and particles, exposure above allowed limits for solvents, dust, etc.
- Many made the danger conditional: fire, skin, and eye damage potential with regard to corrosives, overexposures if spilled, if a leak occurs, if improper handling causes overexposure, if not handled properly, or fire danger.
- Many indicated there was danger, but felt they had minimized it: painting requires fresh air source, etc., employees work with MSDS and handle material properly, biohazardous material HIV (AIDS) hepatitis, other blood borne pathogens, but controlled through engineering controls and/or personnel protectors
- One respondent showed his frustration with environmental regulations: "Living is hazardous to your health."
- One respondent vented frustration with running a business under today's rules: "Production not hazardous to health but workman's compensation rates are high."

Question 6: "How do you receive information on present and future regulations that will impact your business?" Figure B-3 shows the total breakdown of responses. The first option, which says that they receive the regulatory information from an agency representative correlates very well with Question 9, which asks how often they see a regulator. Small companies and companies outside of the metroplex do not see regulators, so

APPENDIX B
DETAILED ANALYSIS BY INDIVIDUAL QUESTION: RESULTS FROM THE VIEWPOINT OF THE MANUFACTURERS

Results by Question

The following discussion provides more detail into each question of the manufacturers survey and its subsequent responses:

Question 4: Do you have any hazardous materials on your premises? The response to this question was clearly affected by size, geographic location, and SIC Code. Figure B-1 shows that smaller companies claimed to not have any hazardous materials at their place of business, but almost all large companies could identify some hazardous materials. We would expect some variation according to the type of business, but the results did not bear this out. For example, machine shops use many cutting oils, coolants, and solvents as part of their production materials. Some of these materials are hazardous and some are not. Assuming that most machine shops use similar or identical materials, it is interesting that only half of them said they did have hazardous materials on their premises and half said they did not. This condition exists with other businesses such as jewelers, furniture and cabinet makers, printers, etc. Without conducting face to face interviews or site inspections, one can still probably conclude that many business owners do not know what is listed as hazardous materials and what is not.

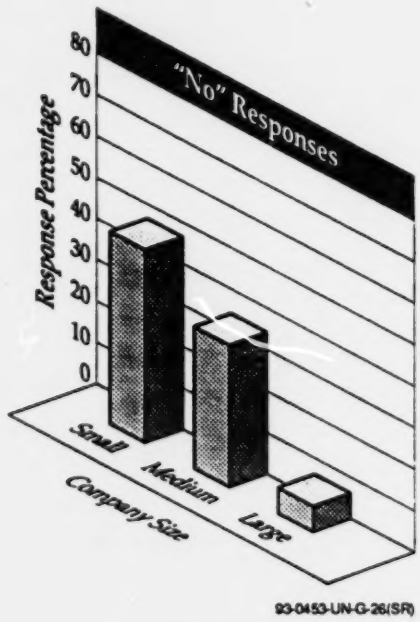

Figure B-1.

Companies that filled out the survey listed the chemicals that they considered hazardous. The following is a partial list of items taken directly from the survey responses:

> xylene, toluene, freon, corrosive acid and lead in batteries, acids, bases, metal salts, glycol ethers, lead, medical wastes, paint, thinner, welding gases, glues, trichlorethane, solid NOS, acetone, alcohol, trichlor, freon TMS, cyanide, nickel, acids, lead plating compounds, styrone, acetone, methanol, trichloroethane, cyanide, glycerol, gasoline, ethyl alcohol, MEK, ethylene oxide, isopropyl alcohol, methylene chloride, freon, various plating chemicals, inks, solvent cement, class c common fireworks, chlorine, motor oil, acetylene, lacquer, urea formaldehyde, resin, photographic chemistry, urethanes, silicones, liquid plastic, epoxy, polyester, fuels, pesticides, turpentine, leather glue, leatherdye, fuel, acrylamide, methanol, ethidiumbromide, liquid nitrogen, bromodioxyurdine, diexpoxybutane, iso-alcohol.

Question 5: "Do any of your processes represent a potential threat to the health or safety of your employees?" Figure B-2, which shows existence of hazardous materials as a function of company size, indicates how similar the responses were to Question 4. However, this outcome is even more critical; it not only acknowledges the existence of a hazardous substance, but deals with

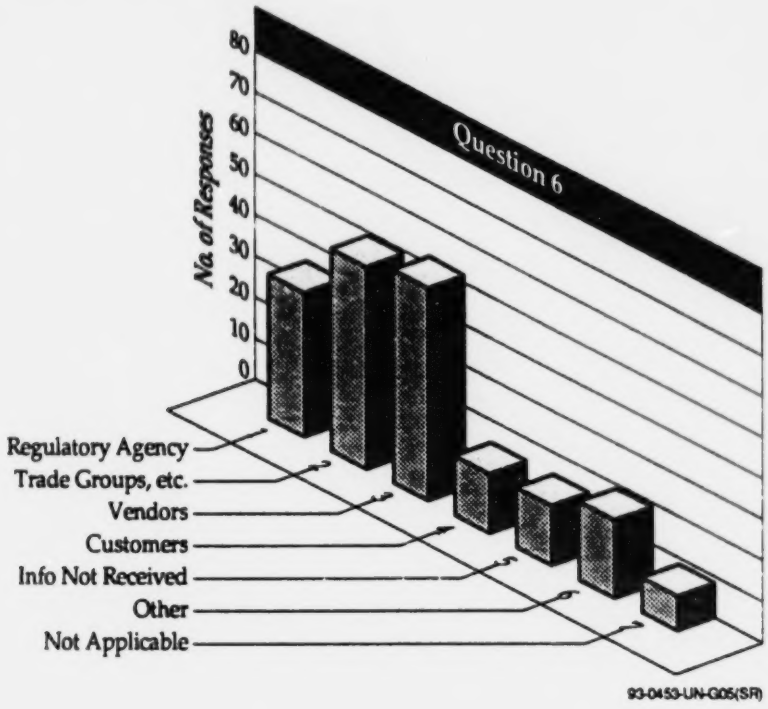

Figure B-3.

consequently will not receive information from them.

Likewise, SME owners do not go to trade association meetings, tradeshows, seminars, etc., which prevents them from obtaining any information about regulatory compliance from that source. Vendors' representatives, the third source of compliance information, don't provide businesses with much information because they can't afford to spend the time or resources needed to keep their small customers up to date.

As might be expected, small companies and rural manufacturers don't receive the information from *any* resource. The response option called "Not Applicable" was marked by more small companies than medium or large, but was not a significant factor for rural versus metroplex companies.

Comments from respondents provide some insight into the problem of staying current with information on compliance. Some companies are fortunate to have a corporate headquarters large enough to maintain an environmental staff. One such company explained: "Our information comes from corporate environmental office, and they communicate with regulatory agencies." "We get information from our plant environmentalist and corporate legal staff." "We have a full time safety administrator." "We have in-house environmental safety staff."

For some, the federal, state, or city regulators are a primary source: "Mostly from SF Industrial pretreatment coordinator." Others feel that: "Regulatory agencies are a poor source." One manufacturer stated simply that: "We try to stay on top of new regulations."

A number of companies confuse regulatory compliance information with having Material Safety Data Sheets (MSDSs): "Suppliers provide MSDS sheets with products." "It is hard to get MSDSs."

For many companies, understanding environmental compliance requirements is a source of irritation and frustration. One respondent relies on the risky technique of "word of mouth." Typical comments included "simple understandable communication information needed" and "it is very difficult to obtain and understand most information." But when asked how he obtained environmental information, one respondent stated eloquently, "haphazardly."

Question 7: "Do you have problems complying with the regulations?" Most responses did not appear to be size- or location-dependent, except the responses "No. Compliance is Straight Forward," and "Not Applicable." A majority of the small companies checked one or the other of these responses, while only 37% of the large companies thought one of those reponses was appropriate. It stands to reason that if one does not receive regulation information, one will assume the issue does not apply to them. Unfortunately, ignorance is a poor excuse for not complying with the law.

The SIC analysis did show significant differences in responses as a function of industry. Figure B-4 illustrates the variability in all of the responses.

Comments on this issue indicated that cost of compliance was an issue. Said one company, "We also have trouble supplying the manpower needed to ensure that we stay in compliance. Cost is also partially a factor....The wide variety of chemicals we use makes treatment and disposal difficult and expensive." The primary problem, however, seems to be deciphering what the regulators want. Typical comments were: "We have minor problems associated with interpretation.... We think and hope we are in full compliance with regulations, but they change frequently and are complicated." Others stated that, "understanding what to do is difficult....Industries are getting over-regulated.... What regulations should be complied with?....Not sure what the regulations are!"....Getting the proper information is not straightforward and is always time consuming." Another common response was that, "Interpretation varies from local, regional, national levels. The informational format is too complicated in regulatory drafts."

There were other reasons cited that make compliance difficult. "What OSHA wants from small businesses is rather cumbersome, not from a technical standpoint, but from a voluminous paperwork aspect....Compliance is too time consuming and tedious, and takes an excessive amount of time to figure out what is applicable." These comments illustrate that it is not regulatory compliance that troubles most businesses, but rather the mounds of paperwork needed to prove one's compliance that appeared to offer any "value added." Some business owners hope that better training or education will relieve some of the burden: "The process is very difficult; we could use more information on the way others solve

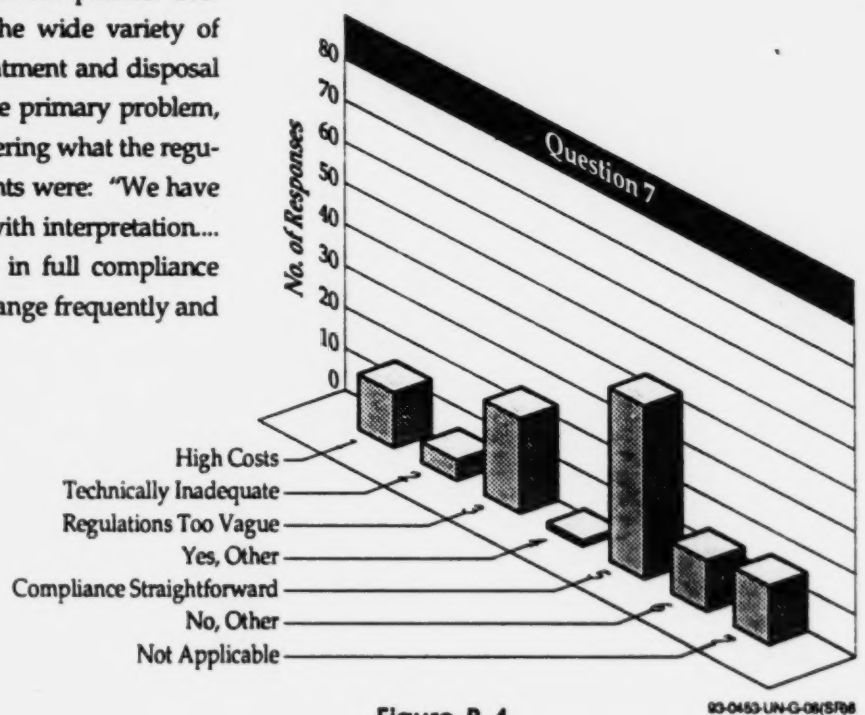

Figure B-4.

compliance problems; this would prevent us from re-inventing a process." Perhaps the most telling comment came from a disgruntled business owner, who remarked, "I have not found a reliable, reasonable means to dispose of the aforementioned sludge."

It was hoped at the conception of the two surveys (business and regulators) that we would be able to compare the common issues through questions such as cost of compliance, availability of technology, etc. However, the industries that the regulators defined as having regulatory problems did not respond to the survey. In some cases where we did have respondents, there were not enough in a particular category to draw any firm conclusions. The few that we did receive did not agree with the regulators' assessments at all.

Question 8: "Do you believe the environmental regulations with which you must comply are necessary?" Figure B-5 provides the total distribution of responses. With one exception, analysis by size and by location did not provide any significant variation in responses. One response, that some regulations were necessary, escalated in percentage of response for large manufacturers. Fifty-nine percent of the large manufacturers checked this option, where only 31% of the small companies checked it. One possible explanation is that larger companies' environmental staffs know the full gamut of environmental laws and must comply at a more stringent level, whereas smaller companies know of only a few regulations that have been brought to their attention.

The responses analyzed by SIC Code were different. The stone, clay, and glass industries are the most supportive of environmental regulations, while most other industries feel that not all regulations are required.

The public tends to look on manufacturers as the primary cause of our environmental problems. But most manufacturers are concerned citizens, like everyone else. "I believe in protecting the environment" was a common attitude expressed in the survey.

Other individuals expressed the conflict between the need for regulations and the difficulty of working with them:

"They are complicated. There is no simplicity. We need to start with basics and work up but we definitely need to be responsible for our environment."

"As a small business we are probably not even aware of all we should be doing; hearsay tells us it would probably put us out of business to do all the *nitpicking* needed. We do try to be reasonably

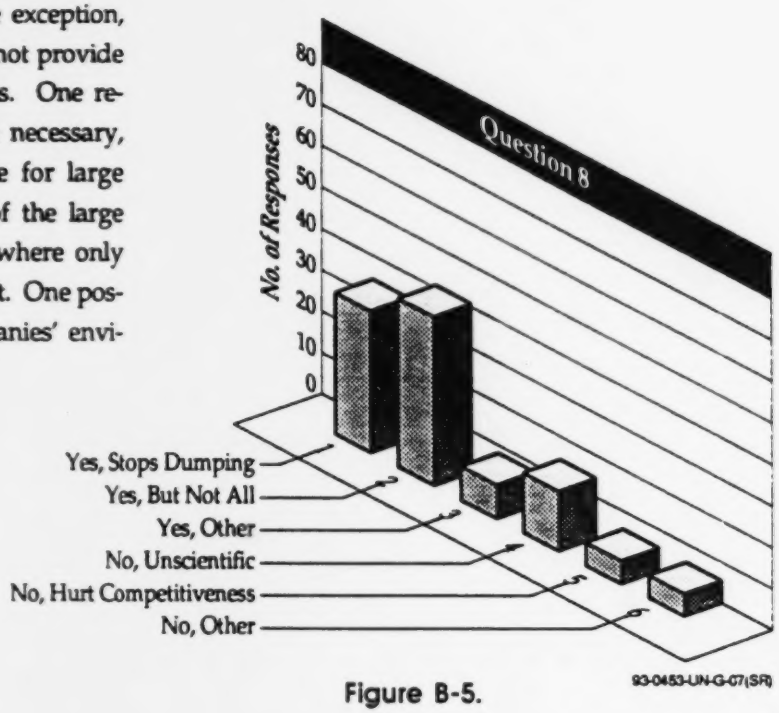

Figure B-5.

safe—no one wants to harm. I believe education needs to be done on what is hazardous and regulated."

Others said, "people/industry must be environmentally conscious," and one even praised the safety and chemical handling regulatory process as being excellent.

While very few manufacturers feel that environmental regulations per se are bad, many feel that not all regulations are beneficial to society. How regulations are established is an issue: "Some requirements don't appear to be scientifically substantiated....Too many regulations are imposed due to radical environmentalists....Freons' impact on ozone layer has been minuscule compared to natural fluctuations."

And there were expressions of anger: "I don't believe OSHA should have the power of accuser, jury, judge, and enforcer. It's a violation of the Constitution! We are complying while some of our competitors have chosen to ignore regulations."

Question 9: "Do you receive visits from regulators in your facility?" Figure B-6 provides the total distribution of responses. More than half of the small companies (1-19 employees) said "No." Only one of the large companies (over 50 employees) said no. Location also plays a significant part, as Metroplex companies were much more likely to see regulators than companies in the rest of the state. Stone, clay, and glass, and jewelry and miscellaneous manufacturing saw the least number of regulators. Food, textiles, and wood products saw the most.

Question 10: "What kind of relationship do you have with regulatory agencies?" Figure B-7 provides the total distribution of responses. While one hears about the antagonistic relationship between business and the environmental regulators, this does not seem to be born out in this study. There is no variation in response because of size, location, or SIC Code.

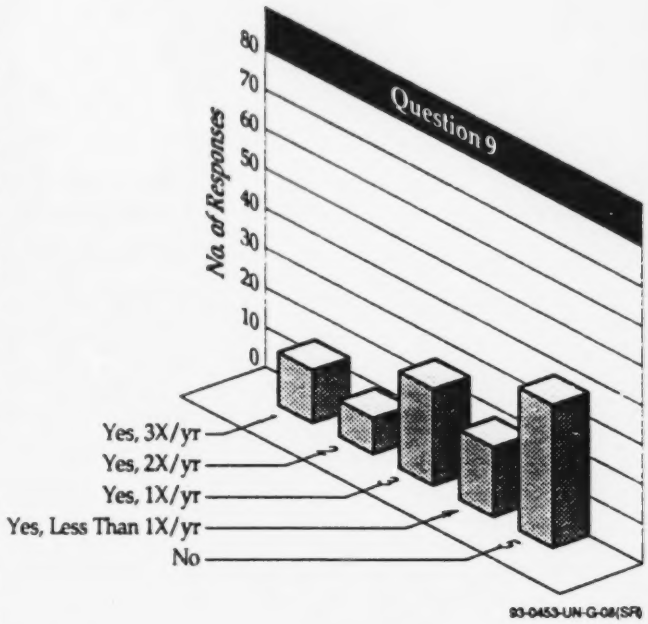

Figure B-6.

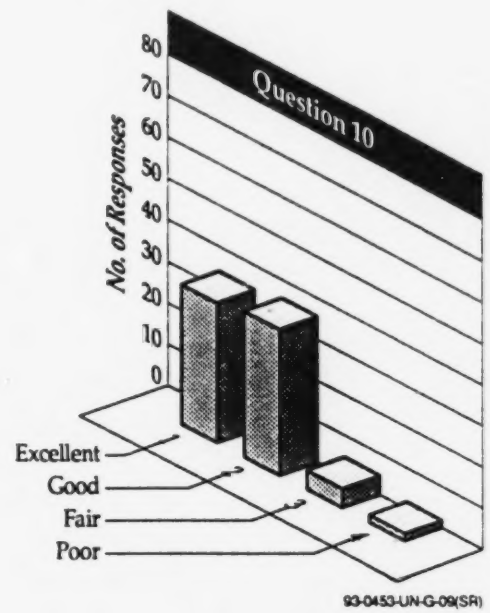

Figure B-7.

The comments provided more insight into the actual relationships. Most are pleased with the regulators: "All the agencies have been very helpful....It is no surprise that a lot of the relationship depends on the attitude of the business owner and the regulator....The relationships are excellent when there is a really knowledgeable person working with us." Most businessmen prefered a partnership with the regulators. Said one, "They should act as educators, not regulators trying to justify their jobs." A small minority seem to have personal problems with the regulators: "I strongly resent their common assumption that everyone is either dishonest or stupid."

Question 11: "Where do you find solutions to environmental problems?" Figure B-8 provides the total distribution of responses. Small manufacturers don't look for solutions to environmental problems to the extent that larger manufacturers do. Most companies look to their vendors for these solutions. Very few see the federal labs as a source of solution to their environmental problems. The responses show that it is even worse for the universities and the 2-year schools.

After vendors, most companies—large, medium, small, metroplex, and rural—receive environmental solutions from other businesses and trade associations. Companies that use seminars for environmental solutions are generally large companies. The survey shows why most seminars conducted for small businesses are usually such a dismal failure: small businessmen don't attend! On the other hand, larger companies frequently can afford to employ seminars. Comments from some of the respondents were as follows: "Seminars can be helpful....We regularly attend seminars to update and continuously improve our processes to be environmentally conscious." Small companies have many of the same processes and use many of the same chemicals as large companies, but one forth of them don't believe that environmental problems apply to them.

Comments indicate that many companies that have larger corporate offices rely on them to provide guidance. The regulators become sources of solutions for some: "They help us comply—the

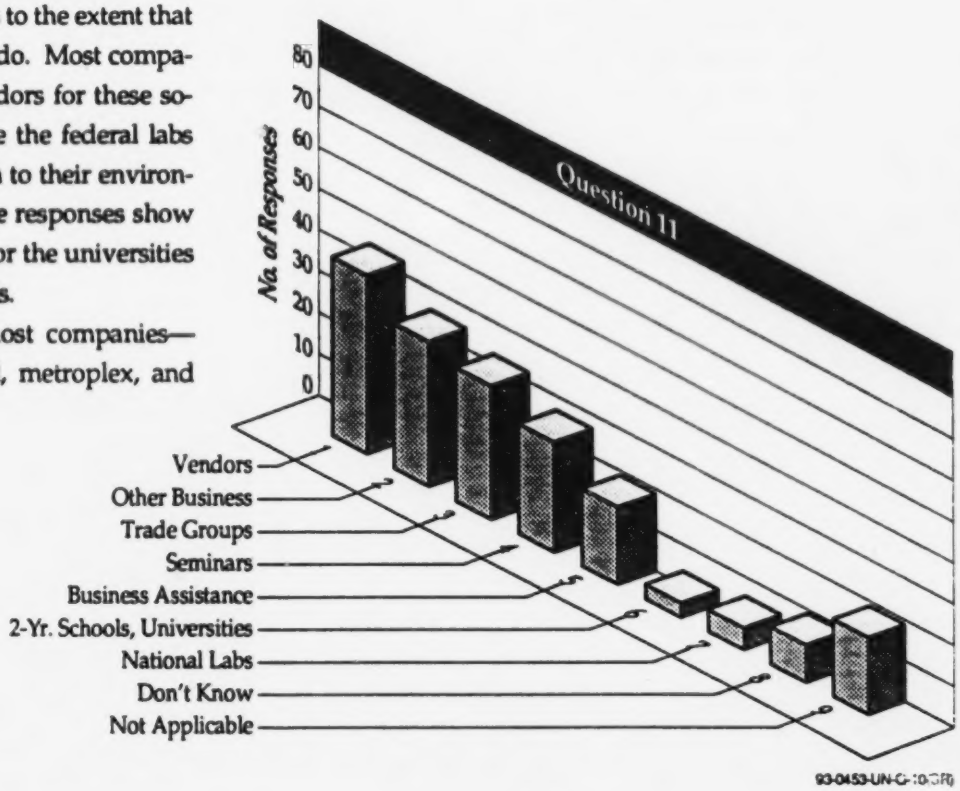

Figure B-8.

regulation agencies....Sometimes they come from the inspectors....We talk to the EPA office or the OSHA office." But not all help from regulators is helpful. Among the comments: "If I had done strictly as I was told when pulling our underground fuel tanks, I would have spent tens of thousands of dollars more than I did, after coming up with my own ideas that were approved....OSHA told me to buy publications. If they want us to comply, they should give businesses what is needed and not have us go looking for publications."

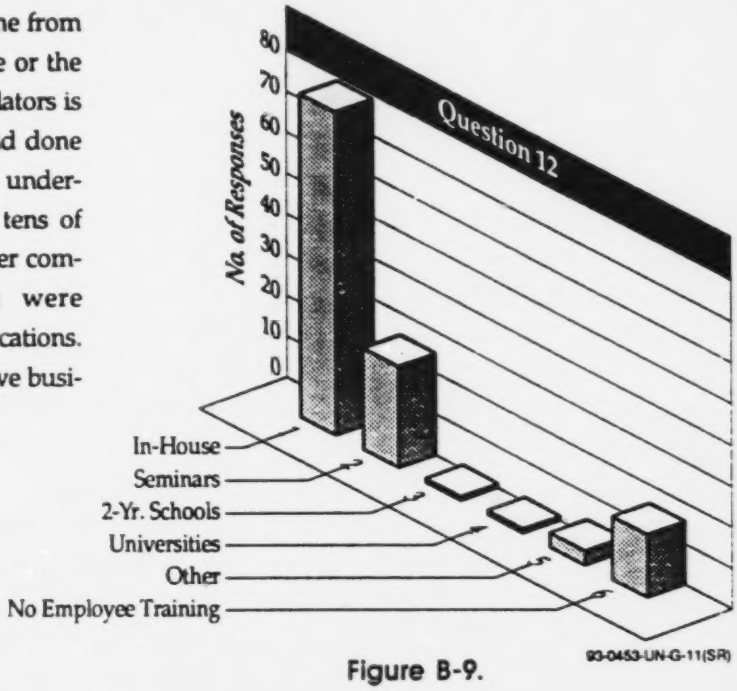

Figure B-9.

Question 12: "How does your company provide for or support employee regulation awareness training or skill development training?" This is a very critical question, since employees that do not understand the ramifications of their effect on the environment will not cooperate with company attempts to comply. The results of the responses are illustrated in Figure B-9. The overwhelming response was that training was done in-house. This raises the question of where the trainers received their training and what the overall quality of the training programs are? The next choice was to use seminars, workshops, etc., but this is a function of size and location. The most disturbing response is that 21% of small companies and 22% of rural companies said that they don't provide any type of training. Another unsettling response was that almost no one recognized that the 2-year schools are a vital resource for environmental training.

Question 13: "How have you developed internal operating standards and practices for handling non-hazardous waste and hazardous waste materials, and reducing and treating solid and hazardous waste?" Figure B-10 shows the distribution of responses. The results are very similar to that for Question 12. Many companies rely on in-house expertise and textbooks to develop operating procedures. Vendors play a big role too. Community colleges, again, are not perceived as a source, and a large number of companies feel that operating procedures are either not applicable or they just don't have operating standards and procedures. Size and location appeared to have little significance.

Question 14: "Does your company have an energy minimization program?" The general distribution of responses provided in Figure B-11 indicate that energy is not an issue for the majority of small and rural manufacturers. Large companies have developed energy conservation programs, most with in-house expertise.

Comments were varied: "We haven't even thought of it...We cannot afford to bring a consultant to help....The electric utility was of no help when they did a survey....We monitor all utility uses as part of our cost management program."

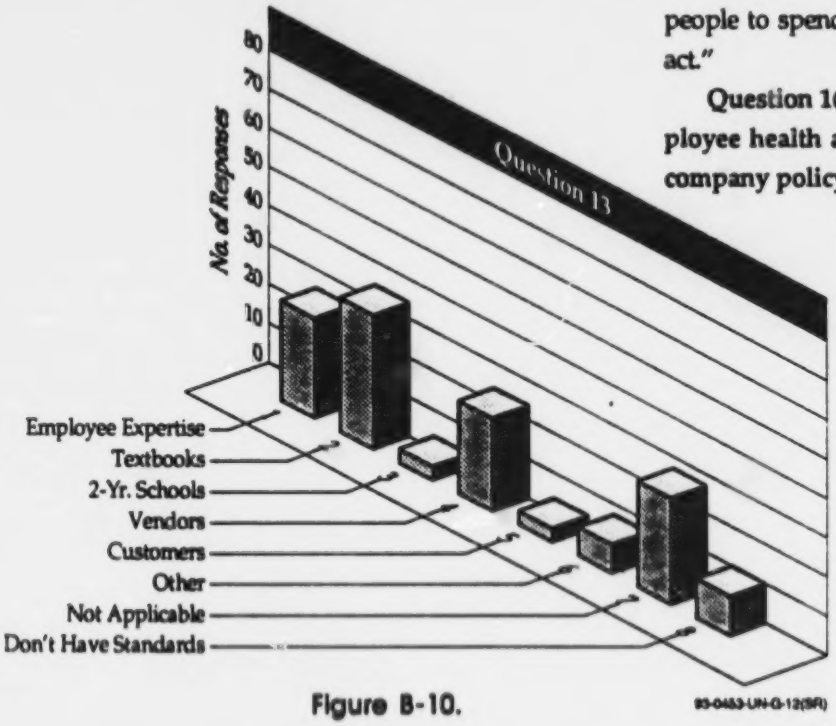

Figure B-10.

people to spend time 'making policies'—we just act."

Question 16: "Does you company have employee health and safety standards as a part of company policy?" The general distribution of responses is provided in Figure B-13. The response to this question is very size-dependent. As with the other questions, 2-year school participation had a very low response. SIC analysis shows consistency in the responses except for the stone, clay, and glass industries, whose businesses do not feel that worker health standards are applicable to them.

Question 15: "Does your company have a pollution control and reduction program?" The results are graphed in Figure B-12. These results indicated almost bi-modal distribution, with the emphasis on the program being developed with in-house expertise and with a pollution control and reduction program being nonapplicable. Again, help from the 2-year schools was not a factor.

The comments about existence of pollution control programs were varied: "We are always re-evaluating our processes to try to cut down on potential pollution....We are working on an environmental 'balance sheet' to be part of our financials....We are a small business. We don't do a lot of 'official' policywork—we all work together in a close, common area. We can't afford

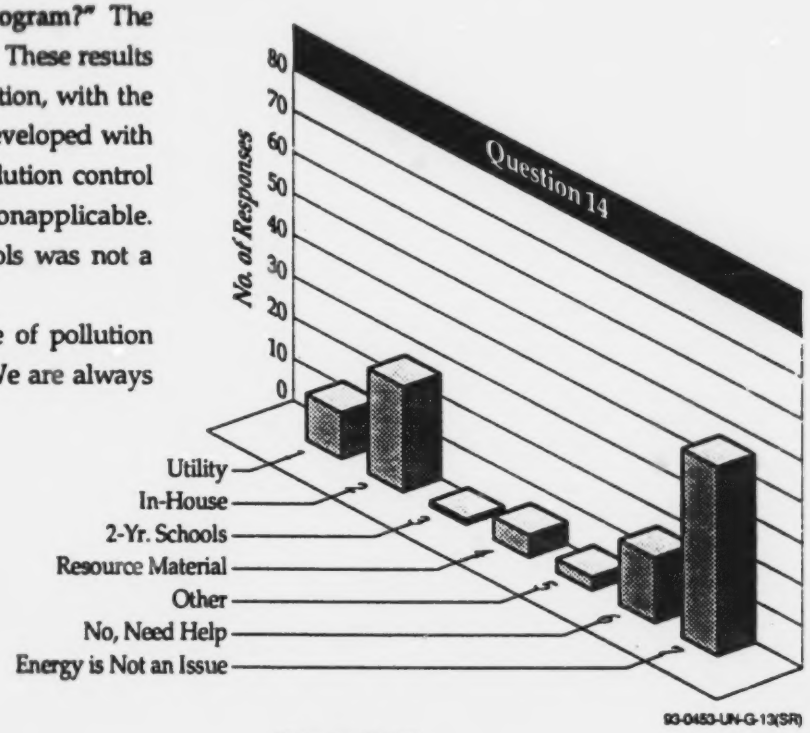

Figure B-11.

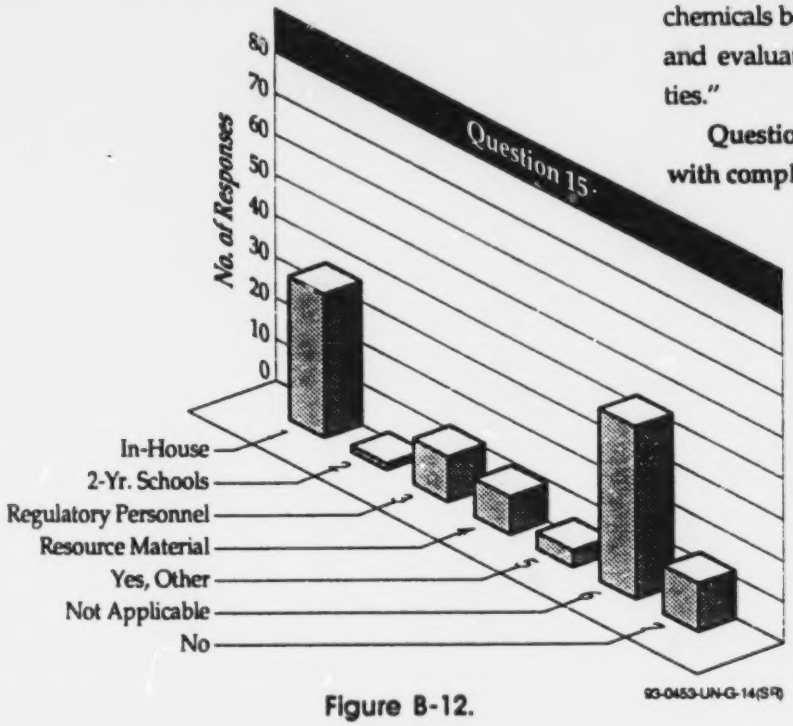

Figure B-12.

Comments indicated that businesses seek help from insurance companies and private consultants.

Question 17: "How does your company reduce the use of high-risk materials or lessen the environmental impact of manufacturing processes?" The general distribution of responses is provided in Figure B-14. Response to this question was also very size-dependent. It is not known whether small companies that stated that the question did not apply to them really do not have hazardous materials on the premises or do not know which materials are hazardous. For example, one company stated, "we have no high-risk materials to our knowledge."

Comments ranged from using in-house and corporate expertise to "recycling and re-using all materials we can to evaluate processes, approve all chemicals before they are introduced into the site, and evaluate new equipment/changes in facilities."

Question 18: "Does your company need help with compliance reporting requirements, audits, or external performance reporting?" The general distribution of responses is provided in Figure B-15. While the majority said "No," the comments tell a different story. Comments included: "Don't know; what reports?, Not that I know of...Maybe it's difficult to know whether all information and data have been supplied and it's difficult to understand what is necessary." Another business owner stated that: "Laws are so vague that we really don't know how or to

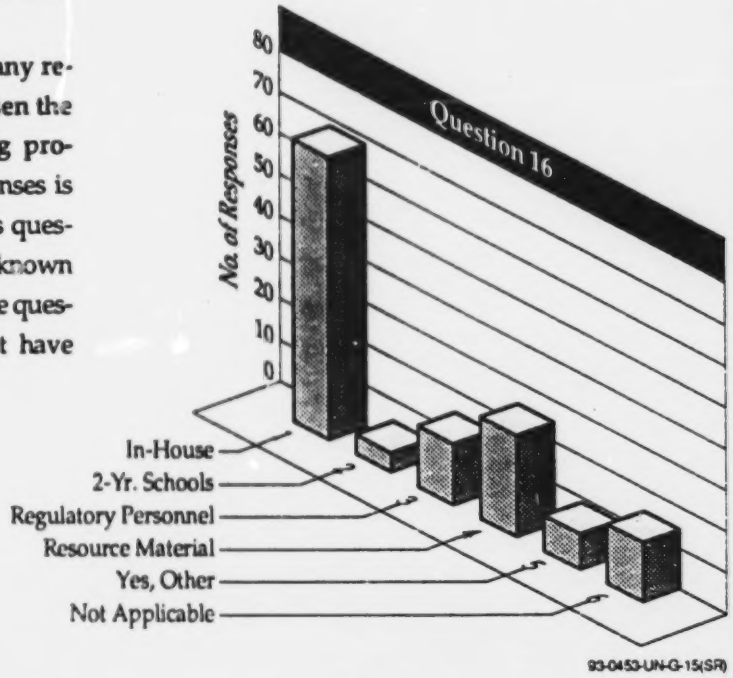

Figure B-13.

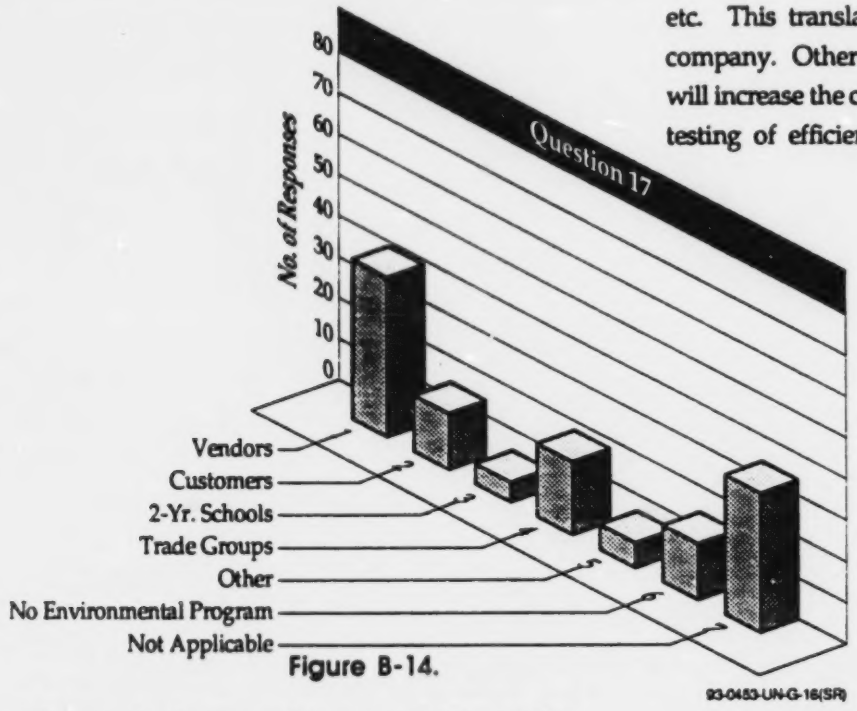

Figure B-14.

what standards we need to report." It is not difficult to sense the frustration present.

Question 19: "What do you see in the way of compliance issues in the next 2 to 5 years that will impact your business?" This question did not offer multiple choices, but strictly requested comments. Opinions ranged from those industries that saw no effect whatsoever to those that were worried about being shut down or facing loss of jobs.

There are, of course, some industries that do not use materials or processes that pose any threat to the environment. To these industries, it is a mute question. But there was a whole class of industries that did not know what to expect in the future. Typical responses were: "Don't know what is to happen....How are we to know about this?...Compliance costs may get so high they prohibit some jobs." Most companies predicted increases in record keeping, reporting procedures, etc. This translated into extra burdens on the company. Other comments were as follows: "It will increase the cost of business and require more testing of efficient processes. Perhaps we will need to hold and ship more material for disposal...Hardware regulations will be tougher in the future, along with stiffer worker protection laws....It is increasingly more difficult to comply with more and more regulations...I see more regulations on environmentally controlled and hazardous materials, resulting in heavier burdens on our firm."

There were some detailed opinions on some of the problem areas in the future. A need was expressed for stormwater pollution prevention programs, including industrial and construction activities; continued mining of groundwater in Albuquerque, whose water level

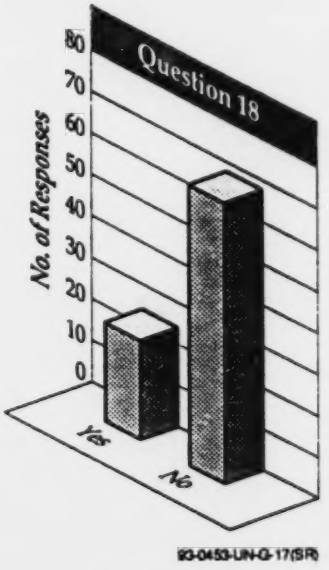

Figure B-15.

is dropping about 4" per year; pretreatment requirements for discharge to the sanitary sewer systems, which may be mandated as a result of tightening documentation in the Rio Grande water quality standards; and further definition of hazardous pollutants regulations. One individual wasn't positive about the future, but suggested a plan to cope with it: "(1) Set up an informal review team to inspect a facility, (2) identify regulations to be complied with, (3) suggest solutions or experts who can help with more complicated areas, and (4) establish an ongoing central referal service for more simple and precise requirements." Others felt the future was a downward spiral. Responses varied: "It will be almost impossible to stay in compliance over the next 2 to 5 years....More restrictive regulations are coming on line....We are way ahead of trends—our goals are set internally....If we're knowledgeably prepared, we'll have no problem."

Question 20: What do you see in the way of compliance issues in the next 5 to 10 years that will impact your business?" As time progresses into the future, so does the pessimism. It is disturbing to find that so many companies think that 5 to 10 years is too far in the future to speculate on the effects environmental conditions will have on their lives. One particularly sad comment summed up several responses: "If they continue as they have, with more strict, binding controls, there may not be any business left to comply with the regulations." Another concerned business owner stated that, "Every reporting requirement costs money that we can't pass on to our customers. The biggest factor is that our business growth will be shaped by what we want to avoid having to comply with. We have no domestic suppliers for some chemicals because no one wants to deal with the liability, compliance issues, or expense, that goes with U.S. manufacturers."

Some companies are very astute in their understanding that one possible solution is *change*. "We will need to find alternative materials and processes for some areas of our process," said one business owner. Others are optimistic: "Economic issues will soften some of the more 'extremist' environmental laws; overall compliance will improve as older systems are replaced by newer ones; a gradual improvement in the environment will continue."

Question 21: "How could the resources available to you be best structured to support you in your efforts to comply with environmental regulations?" Most of the responses to this question did not really address the issue. It is probable that most small companies didn't know that there were resources available, so they were not thinking in terms of assistance providers. The responses were easily grouped into four categories. The first dealt with a need to rewrite the regulations in a language easily understood by a small businessman instead of a lawyer. These comments were made: "Regulations need to be written better. They are too complicated and subject to different interpretations....The regulators and enforcement people must get together and simplify the regulations for easier compliance....Reduce the maze of paper work and tons of wordy regulations and provide concise laws that are easy to learn." One businessman put forth this provocative concept: "Have OSHA, EPA, DOT, and State regulations converge into one regulation! There are too many regulations with difficult interpretations and different reporting requirements. Deliver one annual report to one agency!"

Another category was a request for better information. The most fundamental request was, "I need to know what resources are available." Other respondents stated a need for "more informational material on hazardous waste and ways to minimize its impact....State supported training/compliance....Implementation of local workshops within our city or county." An excellent suggestion was made: "Perhaps a database organized in such a manner as to cross reference information/regulations related to businesses processes could be developed."

The third category expressed a need for improved technology: "We need existing reasonably priced technology for new or more restrictive regulations to receive information on new regulation and assistance in implementation." Finally, some excellent comments that were placed in the "Other" category requested sanity with our bureaucratic government structures: "Help us know our responsibilities and what resources we have....We need gentle assistance, not sarcasm.... We need to be able to do the possible, not the impossible...Unlike government, we can't throw endless money at our problems." These were other memorable suggestions: "If people and companies would take time out to look, listen, and learn instead of being so full of fear, maybe we would have had many solutions to our environmental problems years ago." And this advice: "Two things must happen: government needs to have an industrial policy in order to retain and grow the tax base, and regulatory agencies must get out in the field and form partnerships with businesses to work together to improve safety and the environment.."

APPENDIX C
DATA FOR MANUFACTURING SURVEY

APPENDIX C1
MANUFACTURERS' SURVEY RESULTS AS A FUNCTION OF COMPANY SIZE

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

Survey Results as a Function of Company Size

		Small 1 - 19		Medium 20 - 49		Large 50 & Over	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
4. Do you have any hazardous materials on your premises?	Yes.....	24	46%	13	62%	25	93%
	No.....	25	48%	7	33%	2	7%
	Not sure	3	6%	0	0%	0	0%
5. Do any of your manufacturing processes represent a potential threat to the health or safety of your employees?	Yes.....	13	25%	8	38%	15	56%
	No.....	36	69%	13	62%	11	41%
	Not sure	2	4%	0	0%	1	4%
6. How do you receive information on present and future regulations that will impact your business.	From a regulatory Agency Representative.....	13	25%	9	43%	15	56%
	From Trade Association Meet'gs, Workshops, Materials etc.....	20	38%	11	52%	18	67%
	From Vendor Representatives.....	23	44%	11	52%	17	63%
	From Customers.....	6	12%	4	19%	4	15%
	We don't Receive That Info'.....	8	15%	3	14%	1	4%
	Other_____	4	8%	3	14%	12	44%
	Not Applicable.....	7	13%	1	5%	0	0%
7. Do you have problems complying with the regulations?	Yes, Cost of Compliance is Too High.....	5	10%	3	14%	5	19%
	Yes, the Technology Available is Inadequate.....	3	6%	0	0%	2	7%
	Yes, The Regulations are Too Complicated/Vaguely Written.....	6	12%	5	24%	12	44%
	Yes, Other_____	0	0%	0	0%	2	7%
	No, Compliance is Straight Forward.....	25	48%	8	38%	9	33%
	No, Other_____	7	13%	2	10%	3	11%
	Not Applicable.....	11	21%	1	5%	1	4%
8. Do you believe the environmental regulations with which you must comply are necessary?	Yes, Because it Stops People From Dumping.....	16	31%	7	33%	10	37%
	Yes, Some Regulations, but Not All of Them.....	16	31%	8	38%	16	59%
	Yes, Other_____	6	12%	1	5%	0	0%
	No, Too Many Restrictions Based on Unscientific Information.....	6	12%	4	19%	4	15%
	No, Regulations Stifle Economic Development & Competitiveness	3	6%	0	0%	2	7%
	No, Other_____	5	10%	0	0%	1	4%

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

Survey Results as a Function of Company Size

		Small 1 - 19		Medium 20 - 49		Large 50 & Over	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
9. Do you receive visits from the regulators in your facility?	Yes, 3 or more times a year	4	8%	2	10%	7	26%
	Yes, Twice a year	1	2%	3	14%	5	19%
	Yes, once a year	6	12%	5	24%	13	48%
	Yes, Less than once a year	9	17%	6	29%	2	7%
	No	33	63%	3	14%	1	4%
10. What kind of relationship do you have with regulatory agencies?	Excellent, they try to help me with compliance issues	12	23%	9	43%	13	48%
	Good, as long as I'm trying to comply, it is OK	19	37%	8	38%	11	41%
	Fair, they sometimes threaten me	0	0%	1	5%	4	15%
	Poor, they are negative & I fear they may close down my business	0	0%	2	10%	0	0%
11. Where do you find solutions to environmental regulation problems?	Vendors	17	33%	11	52%	17	63%
	Other Businesses	16	31%	7	33%	12	44%
	Trade Associations	12	23%	8	38%	12	44%
	Seminars	7	13%	6	29%	15	56%
	Business & Technical Assistance Organizations	6	12%	4	19%	9	33%
	Two Year Technical Schools	2	4%	0	0%	2	7%
	Universities	4	8%	1	5%	1	4%
	National Labs	6	12%	2	10%	2	7%
	Don"t know where to look	13	25%	4	19%	0	0%
	Question Not Applicable to Me						
12. How does your company provide for or support employee environmental regulation awareness training or skill development training?	In-house Training	39	75%	15	71%	27	100%
	Seminars, Workshops, etc	4	8%	8	38%	13	48%
	Two Year Technical Schools	0	0%	0	0%	1	4%
	Universities	1	2%	0	0%	0	0%
	Other_____	1	2%	1	5%	1	4%
	We don't Provide Employee Training	11	21%	3	14%	0	0%

Survey Results as a Function of Company Size

		Small 1 - 19		Medium 20 - 49		Large 50 & Over	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
13. How have you developed internal operating standards and practices for handling non-hazardous waste and hazardous materials and reducing and treating solid and hazardous waste?	Employees have the Expertise....	8	15%	6	29%	12	44%
	Developed our Own Using Textbooks as Source Materials...	12	23%	6	29%	14	52%
	Through Class Work at 2-Year Technical Schools.....	0	0%	3	14%	0	0%
	Provided by Vendors.....	9	17%	4	19%	13	48%
	Provided by Customers.....	1	2%	0	0%	2	7%
	Other_____	2	4%	2	10%	4	15%
	Not Applicable.....	20	38%	3	14%	1	4%
	Don't Have Operating Standards & Practices.....	7	13%	2	10%	0	0%
14. Does your company have an energy minimization program?	Yes, Developed with the Electric Utility Personnel.....	6	12%	1	5%	3	11%
	Yes, Developed with In-house Expertise.....	6	12%	4	19%	14	52%
	Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories.....	1	2%	0	0%	0	0%
	Yes, Developed with Resource Material.....	2	4%	0	0%	4	15%
	Yes, Other_____	1	2%	1	5%	1	4%
	No, and We Need Help.....	4	8%	6	29%	7	26%
	No, Energy use isn't an issue.....	33	63%	8	38%	5	19%
15. Does your company have a pollution control and reduction program?	Yes, Developed with In-house Expertise.....	14	27%	5	24%	15	56%
	Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories.....	1	2%	0	0%	1	4%
	Yes, with assistance from Regulatory Personnel.....	2	4%	3	14%	8	30%
	Yes, Developed with Resource Material.....	2	4%	1	5%	6	22%
	Yes, Other_____	0	0%	2	10%	2	7%
	Not Applicable.....	30	58%	4	19%	7	26%
	No.....	5	10%	5	24%	1	4%

Survey Results as a Function of Company Size

		Small 1 - 19		Medium 20 - 49		Large 50 & Over	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
16. Does your company have employee health and safety standards as a part of company policy?	Yes, Developed with In-house Expertise	25	48%	17	81%	25	93%
	Yes, Developed with Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories	3	6%	1	5%	1	4%
	Yes, with assistance from Regulatory Personnel	4	8%	4	19%	7	26%
	Yes, Developed with Resource Material	10	19%	4	19%	11	41%
	Yes, Other_____	1	2%	4	19%	5	19%
	Not Applicable	14	27%	0	0%	0	0%
17. How does your company reduce the use of high risk materials or lesson the environmental impact of manufacturing processes?	Information from Vendors	15	29%	8	38%	16	59%
	Information and Specification changes from Customers	5	10%	3	14%	5	19%
	Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories	2	4%	1	5%	2	7%
	Information from Trade Groups	4	8%	5	24%	9	33%
	Other_____	3	6%	1	5%	4	15%
	We Do Not Run an Environmental Program	6	12%	5	24%	2	7%
	Not Applicable	23	44%	4	19%	4	15%
18. Does your Company Need Help with Compliance Reporting Requirements, Audits, or External Performance Reporting?	Yes	7	13%	7	33%	9	33%
	No	39	75%	11	52%	16	59%

APPENDIX C2
MANUFACTURERS' SURVEY RESULTS AS A FUNCTION OF GEOGRAPHICAL LOCATION

Survey Results as a Function of Geographical Location

		Metroplex		Rest of State		Other	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
4. Do you have any hazardous materials on your premises?	Yes.....	34	71%	23	46%	5	100%
	No.....	11	23%	25	50%		
	Not sure	1	2%	2	4%		
5. Do any of your manufacturing processes represent a potential threat to the health or safety of your employees?	Yes.....	22	46%	13	26%	1	20%
	No.....	24	50%	35	70%	3	60%
	Not sure	0	0%	2	4%	1	20%
6. How do you receive information on present and future regulations that will impact your business.	From a regulatory Agency Representative.....	19	40%	15	30%	3	60%
	From Trade Association Meet'gs, Workshops, Materials etc.....	25	52%	21	42%	3	60%
	From Vendor Representatives.....	28	58%	21	42%	3	60%
	From Customers.....	10	21%	3	6%	1	20%
	We don't Receive That Info'.....	4	8%	9	18%	1	20%
	Other_____	11	23%	7	14%	1	20%
	Not Applicable.....	3	6%	5	10%	0	0%
7. Do you have problems complying with the regulations?	Yes, Cost of Compliance is Too High.....	7	15%	4	8%	2	40%
	Yes, the Technology Available is Inadequate.....	3	6%	2	4%	0	0%
	Yes, The Regulations are Too Complicated/Vaguely Written.....	10	21%	12	24%	1	20%
	Yes, Other_____	1	2%	0	0%	1	20%
	No, Compliance is Straight Forward.....	23	48%	17	34%	2	40%
	No, Other_____	6	13%	6	12%	0	0%
	Not Applicable.....	6	13%	8	16%	0	0%
8. Do you believe the environmental regulations with which you must comply are necessary?	Yes, Because it Stops People From Dumping.....	16	33%	14	28%	4	80%
	Yes, Some Regulations, but Not All of Them.....	19	40%	20	40%	2	40%
	Yes, Other_____	5	10%	3	6%	0	0%
	No, Too Many Restrictions Based on Unscientific Information.....	7	15%	6	12%	1	20%
	No, Regulations Stifle Economic Development & Competitiveness	1	2%	5	10%	0	0%
	No, Other_____	2	4%	4	8%	0	0%

Survey Results as a Function of Geographical Location

		Metroplex		Rest of State		Other	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
9. Do you receive visits from the regulators in your facility?	Yes, 3 or more times a year	9	19%	3	6%	1	20%
	Yes, Twice a year	6	13%	3	6%	0	0%
	Yes, once a year	11	23%	12	24%	1	20%
	Yes, Less than once a year	6	13%	11	22%	1	20%
	No	15	31%	21	42%	1	20%
10. What kind of relationship do you have with regulatory agencies?	Excellent, they try to help me with compliance issues	22	46%	10	20%	2	40%
	Good, as long as I'm trying to comply, it is OK	11	23%	24	48%	1	20%
	Fair, they sometimes threaten me	1	2%	2	4%	2	40%
	Poor, they are negative & I fear they may close down my business	1	2%	0	0%	1	20%
11. Where do you find solutions to environmental regulation problems?	Vendors	23	48%	20	40%	1	20%
	Other Businesses	18	38%	16	32%	1	20%
	Trade Associations	18	38%	12	24%	2	40%
	Seminars	19	40%	7	14%	1	20%
	Business & Technical Assistance Organizations	8	17%	11	22%	0	0%
	Two Year Technical Schools, Universities	3	6%	1	2%	0	0%
	National Labs	6	13%	0	0%	0	0%
	Don"t know where to look	3	6%	5	10%	1	20%
	Question Not Applicable to Me	9	19%	10	20%	0	0%
12. How does your company provide for or support employee environmental regulation awareness training or skill development training?	In-house Training	38	79%	36	72%	5	100%
	Seminars, Workshops, etc	16	33%	7	14%	2	40%
	Two Year Technical Schools	1	2%	0	0%	0	0%
	Universities	1	2%	0	0%	0	0%
	Other_____	3	6%	0	0%	0	0%
	We don't Provide Employee Training	5	10%	11	22%	0	0%

Survey Results as a Function of Geographical Location

		Metroplex		Rest of State		Other	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
13. How have you developed internal operating standards and practices for handling non-hazardous waste and hazardous materials and reducing and treating solid and hazardous waste?	Employees have the Expertise....	12	25%	12	24%	2	40%
	Developed our Own Using Textbooks as Source Materials...	16	33%	14	28%	3	60%
	Through Class Work at 2-Year Technical Schools.....	2	4%	0	0%	1	20%
	Provided by Vendors.....	12	25%	11	22%	0	0%
	Provided by Customers.....	2	4%	1	2%	0	0%
	Other_____	5	10%	3	6%	0	0%
	Not Applicable.....	17	35%	11	22%	0	0%
	Don't Have Operating Standards & Practices.....	3	6%	7	14%	0	0%
14. Does your company have an energy minimization program?	Yes, Developed with the Electric Utility Personnel.....	7	15%	3	6%	1	20%
	Yes, Developed with In-house Expertise.....	14	29%	12	24%	0	0%
	Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories.....	1	2%	0	0%	0	0%
	Yes, Developed with Resource Material.....	4	8%	2	4%	0	0%
	Yes, Other_____	2	4%	1	2%	0	0%
	No, and We Need Help.....	7	15%	8	16%	2	40%
	No, Energy use isn't an issue.....	18	38%	27	54%	1	20%
15. Does your company have a pollution control and reduction program?	Yes, Developed with In-house Expertise.....	19	44%	14	28%	2	40%
	Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories.....	2	5%	0	0%	0	0%
	Yes, with assistance from Regulatory Personnel.....	7	16%	3	6%	1	20%
	Yes, Developed with Resource Material.....	5	12%	4	8%	0	0%
	Yes, Other_____	2	5%	2	4%	0	0%
	Not Applicable.....	17	40%	24	48%	1	20%
	No.....	6	14%	5	10%	1	20%

Survey Results as a Function of Geographical Location

		Metroplex		Rest of State		Other	
		Resp's	Percent	Resp's	Percent	Resp's	Percent
16. Does your company have employee health and safety standards as a part of company policy?	Yes, Developed with In-house Expertise	28	58%	36	72%	4	80%
	Yes, Developed with Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories	5	10%	0	0%	0	0%
	Yes, with assistance from Regulatory Personnel	9	19%	6	12%	0	0%
	Yes, Developed with Resource Material	17	35%	7	14%	1	20%
	Yes, Other_____	5	10%	3	6%	1	20%
	Not Applicable	5	10%	10	20%	0	0%
17. How does your company reduce the use of high risk materials or lesson the environmental impact of manufacturing processes?	Information from Vendors	20	42%	17	34%	2	40%
	Information and Specification changes from Customers	9	19%	4	8%	0	0%
	Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories	5	10%	0	0%	0	0%
	Information from Trade Groups	9	19%	9	18%	0	0%
	Other_____	5	10%	2	4%	0	0%
	We Do Not Run an Environmental Program	4	8%	8	16%	1	20%
	Not Applicable	12	25%	21	42%	0	0%
18. Does your Company Need Help with Compliance Reporting Requirements, Audits, or External Performance Reporting?	Yes	12	25%	9	18%	2	40%
	No	31	65%	35	70%	2	40%

APPENDIX C3
MANUFACTURERS' SURVEY RESULTS AS A FUNCTION OF SIC CODE

SIC CODES

The Standard Industrial Codes (SIC) for manufacturing are listed below:

Industry Sector 20 Food Products
Industry Sector 22 Textile Products
Industry Sector 23 Apparel and Other Textile Products
Industry Sector 24 Lumber and Wood Products
Industry Sector 25 Furniture and Fixtures
Industry Sector 26 Paper and Allied Products
Industry Sector 27 Printing and Publishing
Industry Sector 28 Chemicals and Allied Products
Industry Sector 29 Petroleum Refining and Related Industries
Industry Sector 30 Rubber and Misc. Plastics Products
Industry Sector 31 Leather and Leather Products
Industry Sector 32 Stone, Clay, and Glass Products
Industry Sector 33 Primary Metal Industries
Industry Sector 34 Fabricated Metal Products
Industry Sector 35 Industrial Machinery and Equipment
Industry Sector 36 Electronic and Other Electric Equipment
Industry Sector 367 Printed Wiring Boards
Industry Sector 37 Transportation Equipment
Industry Sector 38 Instruments and Related Products
Industry Sector 39 Miscellaneous Manufacturing Industries

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

Survey Results as a Function of Standard Industrial Code

		20, 22-26		27-30		32		33, 34, 367		35-38		39		Other	
		Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent
4. Do you have any hazardous materials on your premises?	Yes.....	12	48%	14	74%	3	43%	11	69%	13	65%	3	43%	6	75%
	No.....	13	52%	3	16%	4	57%	4	25%	7	35%	3	43%	2	25%
	Not sure	0	0%	2	11%	0	0%	0	0%	0	0%	1	14%	0	0%
5. Do any of your manufacturing processes represent a potential threat to the health or safety of your employees?	Yes.....	6	24%	8	42%	1	14%	8	50%	9	45%	3	43%	2	25%
	No.....	18	72%	10	53%	6	86%	8	50%	10	50%	3	43%	6	75%
	Not sure	1	4%	1	5%	0	0%	0	0%	0	0%	1	14%	0	0%
6. How do you receive information on present and future regulations that will impact your business.	From a regulatory Agency Representative.....	8	32%	7	37%	3	43%	6	38%	9	45%	1	14%	4	50%
	From Trade Association Meet'gs, Workshops, Materials etc.....	11	44%	11	58%	4	57%	6	38%	8	40%	4	57%	5	63%
	From Vendor Representatives.....	10	40%	10	53%	4	57%	9	56%	12	60%	4	57%	2	25%
	From Customers.....	3	12%	2	11%	1	14%	3	19%	3	15%	0	0%	1	13%
	We don't Receive That Info'.....	4	16%	3	16%	0	0%	2	13%	2	10%	2	29%	1	13%
	Other_____	5	20%	3	16%	1	14%	2	13%	5	25%	1	14%	2	25%
	Not Applicable.....	2	8%	1	5%	2	29%	0	0%	2	10%	1	14%	0	0%
7. Do you have problems complying with the regulations?	Yes, Cost of Compliance is Too High.....	9	36%	1	5%	0	0%	5	31%	1	5%	1	14%	0	0%
	Yes, the Technology Available is Inadequate.....	0	0%	1	5%	1	14%	2	13%	0	0%	1	14%	0	0%
	Yes, The Regulations are Too Complicated/Vaguely Written.....	8	32%	5	26%	1	14%	5	31%	2	10%	2	29%	1	13%
	Yes, Other_____	2	8%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	No, Compliance is Straight Forward.....	8	32%	7	37%	4	57%	7	44%	10	50%	2	29%	3	38%
	No, Other_____	1	4%	2	11%	1	14%	2	13%	3	15%	1	14%	2	25%
	Not Applicable.....	2	8%	2	11%	2	29%	1	6%	4	20%	2	29%	1	13%

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

Survey Results as a Function of Standard Industrial Code

		20, 22-26		27-30		32		33, 34, 367		35-38		39		Other	
		Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent
8. Do you believe the environmental regulations with which you must comply are necessary?	Yes, Because it Stops People From Dumping	7	28%	3	16%	4	57%	6	38%	7	35%	2	29%	4	50%
	Yes, Some Regulations, but Not All of Them	13	52%	8	42%	1	14%	9	56%	6	30%	3	43%	2	25%
	Yes, Other_____	2	8%	1	5%	2	29%	0	0%	1	5%	1	14%	0	0%
	No, Too Many Restrictions Based on Unscientific Information	4	16%	2	11%	1	14%	3	19%	3	15%	0	0%	1	13%
	No, Regulations Stifle Economic Development & Competitiveness	1	4%	2	11%	1	14%	1	6%	0	0%	1	14%	0	0%
	No, Other_____	1	4%	1	5%	0	0%	1	6%	1	5%	2	29%	0	0%
9. Do you receive visits from the regulators in your facility?	Yes, 3 or more times a year	4	16%	1	5%	1	14%	4	25%	2	10%	1	14%	0	0%
	Yes, Twice a year	4	16%	1	5%	0	0%	2	13%	1	5%	0	0%	0	0%
	Yes, once a year	7	28%	4	21%	0	0%	5	31%	4	20%	2	29%	2	25%
	Yes, Less than once a year	5	20%	5	26%	1	14%	1	6%	4	20%	0	0%	1	13%
	No	2	8%	9	47%	5	71%	4	25%	8	40%	4	57%	5	63%
10. What kind of relationship do you have with regulatory agencies?	Excellent, they try to help me with compliance issues	6	24%	5	26%	2	29%	6	38%	8	40%	4	57%	2	25%
	Good, as long as I'm trying to comply, it is OK	13	53%	10	53%	2	29%	6	38%	7	35%	0	0%	1	13%
	Fair, they sometimes threaten me	5	20%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	Poor, they are negative & I fear they may close down my business	1	4%	0	0%	0	0%	1	6%	0	0%	0	0%	0	0%

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

Survey Results as a Function of Standard Industrial Code

		20, 22-26		27-30		32		33, 34, 367		35-38		39		Other	
		Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent
11. Where do you find solutions to environmental regulation problems?	Vendors	5	20%	9	47%	2	29%	12	75%	8	40%	4	57%	4	50%
	Other Businesses	6	24%	4	21%	4	57%	9	56%	5	25%	4	57%	3	38%
	Trade Associations	7	28%	5	26%	3	43%	5	31%	7	35%	3	43%	2	25%
	Seminars	3	12%	3	16%	2	29%	5	31%	10	50%	1	14%	3	38%
	Business & Technical Assistance Organizations	4	16%	3	16%	1	14%	3	19%	4	20%	2	29%	1	13%
	Two Year Technical Schools, Universities	1	4%	0	0%	0	0%	0	0%	2	10%	1	14%	0	0%
	National Labs	0	0%	1	5%	0	0%	1	6%	2	10%	1	14%	1	13%
	Don"t know where to look	3	12%	3	16%	0	0%	2	13%	0	0%	2	29%	0	0%
	Question Not Applicable to Me	5	20%	5	26%	1	14%	1	6%	4	20%	2	29%	1	13%
12. How does your company provide for or support employee environmental regulation awareness training or skill development training?	In-house Training	18	72%	13	68%	6	86%	12	75%	17	85%	5	71%	7	88%
	Seminars, Workshops, etc.	5	20%	3	16%	3	43%	4	25%	5	25%	1	14%	0	0%
	Two Year Technical Schools	0	0%	0	0%	0	0%	0	0%	0	0%	1	14%	0	0%
	Universities	0	0%	0	0%	0	0%	1	6%	0	0%	0	0%	0	0%
	Other_____	1	4%	0	0%	0	0%	0	0%	2	10%	0	0%	1	13%
	We don't Provide Employee Training	3	12%	5	26%	0	0%	4	25%	1	5%	2	29%	1	13%
13. How have you developed internal operating standards and practices for handling non-hazardous waste and hazardous materials and reducing and treating solid and hazardous waste?	Employees have the Expertise	5	20%	5	26%	0	0%	3	19%	6	30%	4	57%	4	50%
	Developed our Own Using Textbooks as Source Materials	6	24%	6	32%	3	43%	11	69%	4	20%	1	14%	2	25%
	Through Class Work at 2-Year Technical Schools	0	0%	0	0%	0	0%	1	6%	1	5%	0	0%	1	13%
	Provided by Vendors	4	16%	3	16%	3	43%	5	31%	3	15%	3	43%	1	13%
	Provided by Customers	0	0%	0	0%	0	0%	1	6%	0	0%	1	14%	0	0%
	Other_____	0	0%	0	0%	0	0%	1	6%	5	25%	0	0%	0	0%
	Not Applicable	5	20%	5	26%	2	29%	0	0%	4	20%	2	29%	2	25%
	Don't Have Operating Standards & Practices	2	8%	2	11%	0	0%	4	25%	1	5%	1	14%	1	13%

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

Survey Results as a Function of Standard Industrial Code

		20, 22-26		27-30		32		33, 34, 367		35-38		39		Other	
		Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent
14. Does your company have an energy minimization program?	Yes, Developed with the Electric Utility Personnel	3	12%	1	5%	0	0%	2	13%	3	15%	1	14%	0	0%
	Yes, Developed with In-house Expertise	5	20%	4	21%	1	14%	3	19%	7	35%	2	29%	2	25%
	Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories	0	0%	0	0%	0	0%	1	6%	0	0%	0	0%	0	0%
	Yes, Developed with Resource Material	1	4%	1	5%	0	0%	1	6%	1	5%	1	14%	0	0%
	Yes, Other_____	0	0%	1	5%	1	14%	0	0%	1	5%	0	0%	0	0%
	No, and We Need Help	5	20%	2	11%	0	0%	7	44%	3	15%	0	0%	1	13%
	No, Energy use isn't an issue	12	48%	10	53%	5	71%	4	25%	7	35%	4	57%	5	63%
15. Does your company have a pollution control and reduction program?	Yes, Developed with In-house Expertise	4	16%	6	32%	3	43%	7	44%	2	10%	3	43%	3	38%
	Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories	0	0%	0	0%	0	0%	1	6%	3	15%	0	0%	0	0%
	Yes, with assistance from Regulatory Personnel	5	20%	1	5%	0	0%	3	19%	4	20%	0	0%	0	0%
	Yes, Developed with Resource Material	1	4%	1	5%	0	0%	3	19%	2	10%	0	0%	0	0%
	Yes, Other_____	2	8%	1	5%	0	0%	0	0%	2	10%	0	0%	0	0%
	Not Applicable	10	40%	9	47%	4	57%	2	13%	8	40%	4	57%	5	63%
	No	3	12%	3	16%	0	0%	5	31%	1	5%	0	0%	0	0%

Survey Results as a Function of Standard Industrial Code

		20, 22-26		27-30		32		33, 34, 367		35-38		39		Other	
		Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent	Resp'	Percent
16. Does your company have employee health and safety standards as a part of company policy?	Yes, Developed with In-house Expertise	19	76%	13	68%	3	43%	10	63%	12	60%	6	86%	5	63%
	Yes, Developed with Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories	0	0%	1	5%	0	0%	2	13%	2	10%	0	0%	0	0%
	Yes, with assistance from Regulatory Personnel	1	4%	4	21%	1	14%	3	19%	4	20%	0	0%	1	13%
	Yes, Developed with Resource Material	5	20%	5	26%	0	0%	5	31%	7	35%	0	0%	1	13%
	Yes, Other_____	4	16%	2	11%	0	0%	1	6%	2	10%	1	14%	0	0%
	Not Applicable	2	8%	1	5%	3	43%	2	13%	3	15%	1	14%	3	38%
17. How does your company reduce the use of high risk materials or lesson the environmental impact of manufacturing processes?	Information from Vendors	7	28%	7	37%	2	29%	11	69%	7	35%	3	43%	1	13%
	Information and Specification changes from Customers	3	12%	0	0%	0	0%	6	38%	3	15%	0	0%	0	0%
	Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories	0	0%	0	0%	0	0%	2	13%	2	10%	1	14%	0	0%
	Information from Trade Groups	2	8%	4	21%	1	14%	5	31%	3	15%	1	14%	1	13%
	Other_____	3	12%	1	5%	1	14%	0	0%	2	10%	0	0%	0	0%
	We Do Not Run an Environmental Program	6	24%	2	11%	0	0%	1	6%	3	15%	0	0%	0	0%
	Not Applicable	5	20%	8	42%	3	43%	2	13%	4	20%	4	57%	6	75%
18. Does your Company Need Help with Compliance Reporting Requirements, Audits, or External Performance Reporting?	Yes	4	16%	3	16%	0	0%	8	50%	5	25%	2	29%	2	25%
	No	17	68%	14	74%	7	100%	7	44%	12	60%	4	57%	6	75%

APPENDIX D

THE SURVEY INSTRUMENTS

SURVEY OF MANUFACTURING'S ENVIRONMENTAL REQUIREMENTS NEEDS

All of the information provided in this survey will be held **STRICTLY** confidential

Company Name: (This info is optional) _____

City _____

Type of Organization

1 Incorporated ☐
2 Proprietorship ☐
3 Partnership ☐

Contact Person (Optional) _____ Contact Phone Number_____

1. Number of Employees _____ 2. Approximate Annual Sales _____

3. Using the accompanying Standard Industrial Code List, Identify the Primary and Secondary Product Area produced in this plant.

   Primary _____

   Secondary _____

If you would like a complementary copy of the survey report, please mark the box: ☐

4. Do you have any hazardous materials on your premises?
What materials are they?_____

Yes..... 1. ☐
No..... 2. ☐
Not sure 3. ☐

_____

_____

5. Do any of your manufacturing processes represent a potential threat to the health or safety of your employees?
Please explain._____

Yes..... 1. ☐
No..... 2. ☐
Not sure 3. ☐

_____

6. How do you receive information on present and future regulations that will impact your business.
Comments:_____

From a regulatory Agency Representative..... 1. ☐
From Trade Association Meet'gs, Workshops, Materials etc..... 2. ☐
From Vendor Representatives..... 3. ☐
From Customers..... 4. ☐
We don't Receive That Info'..... 5. ☐
Other_____ 6. ☐
Not Applicable..... 7. ☐

_____

_____

7. Do you have problems complying with the regulations?
Why?:_____

_____

_____

_____

_____

Yes, Cost of Compliance is Too High..... 1. ☐
Yes, the Technology Available is Inadequate..... 2. ☐
Yes, The Regulations are Too Complicated/Vaguely Written..... 3. ☐
Yes, Other_____ 4. ☐
No, Compliance is Straight Forward..... 5. ☐
No, Other_____ 6. ☐
Not Applicable..... 7. ☐

8. Do you believe the environmental regulations with which you must comply are necessary?
Why or why not?_____

_____

_____

_____

Yes, Because it Stops People From Dumping..... 1. ☐
Yes, Some Regulations, but Not All of Them..... 2. ☐
Yes, Other_____ 3. ☐
No, Too Many Restrictions Based on Unscientific Information..... 4. ☐
No, Regulations Stifle Economic Development & Competitiveness 5. ☐
No, Other_____ 6. ☐

9. Do you receive visits from the regulators in your facility?

Yes, 3 or more times a year..... 1. ☐
Yes, Twice a year..... 2. ☐
Yes, once a year..... 3. ☐
Yes, Less than once a year..... 4. ☐
No..... 5. ☐

10. What kind of relationship do you have with regulatory agencies?
Comments:_____

_____

_____

_____

Excellent, they try to help me with compliance issues..... 1. ☐
Good, as long as I'm trying to comply, it is OK..... 2. ☐
Fair, they sometimes threaten me..... 3. ☐
Poor, they are negative & I fear they may close down my business..... 4. ☐

11. Where do you find solutions to environmental regulation problems?
Comments:_____

_____

_____

_____

_____

Vendors..... 1. ☐
Other Businesses..... 2. ☐
Trade Associations..... 3. ☐
Seminars..... 4. ☐
Business & Technical Assistance Organizations..... 5. ☐
Two Year Technical Schools.....
Universities..... 6. ☐
National Labs..... 7. ☐
Don"t know where to look..... 8. ☐
Question Not Applicable to Me.... 9. ☐

12. How does your company provide for or support employee environmental regulation awareness training or skill development training?
Comments:_____

_____

In-house Training..... 1. ☐
Seminars, Workshops, etc..... 2. ☐
Two Year Technical Schools..... 3. ☐
Universities..... 4. ☐
Other_____ 5. ☐
We don't Provide Employee Training..... 6. ☐

13. How have you developed internal operating standards and practices for handling non-hazardous waste and hazardous materials and reducing and treating solid and hazardous waste?
Comments:_____

_____

_____

_____

_____

Employees have the Expertise.... 1. ☐
Developed our Own Using Textbooks as Source Materials... 2. ☐
Through Class Work at 2-Year Technical Schools..... 3. ☐
Provided by Vendors..... 4. ☐
Provided by Customers..... 5. ☐
Other_____ 6. ☐
Not Applicable..... 7. ☐
Don't Have Operating Standards & Practices..... 8. ☐

14. Does your company have an energy minimization program?
Comments:_____

_____

_____

_____

_____

Yes, Developed with the Electric Utility Personnel..... 1. ☐
Yes, Developed with In-house Expertise..... 2. ☐
Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories..... 3. ☐
Yes, Developed with Resource Material..... 4. ☐
Yes, Other_____ 5 ☐
No, and We Need Help..... 6. ☐
No, Energy use isn't an issue..... 7. ☐

15. Does your company have a pollution control and reduction program?
Comments:_____

_____

_____

_____

_____

Yes, Developed with In-house Expertise..... 1. ☐
Yes, Developed with Information provided by Two Year Technical Schools, Universities, or Federal Laboratories..... 2. ☐
Yes, with assistance from Regulatory Personnel..... 3. ☐
Yes, Developed with Resource Material..... 4. ☐
Yes, Other_____ 5. ☐
Not Applicable..... 6. ☐
No..... 7. ☐

16. Does your company have employee health and safety standards as a part of company policy?
Comments:_____

_____

_____

_____

_____

Yes, Developed with In-house Expertise..... 1. ☐
Yes, Developed with Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories..... 2. ☐
Yes, with assistance from Regulatory Personnel..... 3. ☐
Yes, Developed with Resource Material..... 4. ☐
Yes, Other_____ 5. ☐
Not Applicable..... 6. ☐

17. How does your company reduce the use of high risk materials or lesson the environmental impact of manufacturing processes?
Comments:_____

_____

_____

Information from Vendors..... 1. ☐
Information and Specification changes from Customers..... 2. ☐
Information provided by 2-Year Technical Schools, Universities, or Federal Laboratories..... 3. ☐
Information from Trade Groups... 4. ☐
Other_____
We Do Not Run an Environmental Program..... 5. ☐
Not Applicable..... 6. ☐
7. ☐

18. Does your Company Need Help with Compliance Reporting Requirements, Audits, or External Performance Reporting?
Comments:

Yes..... 1. ☐
No..... 2. ☐

19. What do you see in the way of compliance issues in the next 2 to 5 years that will impact your business?

20. What do you see in the way of compliance issues in the next 5 to 10 years that will impact your business?

21. How could the resources available to you be best structured to support you in your efforts to comply with environmental regulations?

STANDARD INDUSTRIAL CLASSIFICATION CODES

FOR NEW MEXICO INDUSTRIES

SIC CODE	DESCRIPTION
20	Foods
201	Meat/Poultry Process'g
202	Dairies
203	Canned & Frozen Food
204-5	Grain/Flour Products
	Other Foods
22	Textiles (i.e., mills)
23	Apparel
24	Lumber
241-2	Logging, Sawmills,etc
243	Millwork, Cabinets
25	Furniture
26	Paper
27	Printing
28	Chemicals
281	Chemicals & Gases
282	Plastic Mat'ls & Resins
283	Bio-related Chem's
284	Soaps/Clean'g Mat'ls
285	Paints/Finishes
286	Ethanol/Organic Chem's
287	Agricultural Chem's
289	Other Chemicals
29	Petroleum
291	Refining
295	Asphalt Products
299	Petrol/Coal Products
30	Rubber & Plastics
31	Leathers
311	Tanning & Finishing
319	Leather Products
32	Stone/Clay/Glass
321-3	Glass & Glass Products
324-6	Concrete, Clay Prod'ts
327-9	Other

33	Primary Metals
333	Mining
334-7	Foundry & Forming
339	Primary Metal Prod'ts
34	Fabricated Metals
341-6,8-9	Metal Fab & Machining
347	Metal Finishing
35	Machinery
351-6,9	Machanical Machinery
357	Computer Equipment
358	Refrigeration Equip.
36	Electrical
361-6,8-9	Elect. Assembly
3691	Storage Batteries
367	Circuit Boards
37	Transportation Equip.
38	Scientific Instruments
39	Signs/Misc.
391, 6	Jewelry

Environmental Regulators

Industry Questionnaire

We are interested in determining what issues you face in assisting New Mexico manufacturers either get into or remain compliant with New Mexico Environmental regulations. Any anecdotal information that you can supply will aid us in developing target areas for education and for technology transfer into the private sector. Information you provide will be held confidential. Your name is optional, but we do need to know which section of environmental regulations you are most concerned with (air, water, solid waste, etc.).

NAME (Optional)_____

Primary Discipline_____
(such as water, air, etc.)

Secondary Discipline_____

If you would be interested in a complimentary copy of the study, please indicate (and be sure to give us a mailing address)_____

In the following questions, please indicate the industrial areas that are having major or only minor environmental problems (There may be more than one). No response indicates that the industrial sector has few or no compliance problems. Identify opposite the SIC number after each question. In the multiple choice questions, multiple answers are acceptable. Any additional information you can provide would help us understand the issues better.

1. What industries are having problems complying with environmental regulations?

SIC CODE	DESCRIPTION	MAJOR PROBLEMS	MINOR PROBLEMS
20	Foods		
201	Meat/Poultry Process'g	_____	_____
202	Dairies	_____	_____
203	Canned & Frozen Food	_____	_____
204-5	Grain/Flour Products	_____	_____
	Other Foods	_____	_____
22	Textiles (i.e., mills)	_____	_____
23	Apparel	_____	_____
24	Lumber		
241-2	Logging, Sawmills,etc .	_____	_____
243	Millwork, Cabinets	_____	_____
25	Furniture	_____	_____
26	Paper	_____	_____
27	Printing	_____	_____
28	Chemicals		
281	Chemicals & Gases	_____	_____
282	Plastic Mat'ls & Resins	_____	_____
283	Bio-related Chem's	_____	_____
284	Soaps/Clean'g Mat'ls	_____	_____
285	Paints/Finishes	_____	_____
286	Ethanol/Organic Chem's	_____	_____
287	Agricultural Chem's	_____	_____
289	Other Chemicals	_____	_____
29	Petroleum		
291	Refining	_____	_____
295	Asphalt Products	_____	_____
299	Petrol/Coal Products	_____	_____
30	Rubber & Plastics	_____	_____
31	Leathers		
311	Tanning & Finishing	_____	_____
319	Leather Products	_____	_____
32	Stone/Clay/Glass		
321-3	Glass & Glass Products	_____	_____
324-6	Concrete, Clay Prod'ts	_____	_____
327-9	Other	_____	_____

33	Primary Metals			
333	Mining	_____	_____	
334-7	Foundry & Forming	_____	_____	
339	Primary Metal Prod'ts	_____	_____	
34	Fabricated Metals			
341-6,8-9	Metal Fab & Machining	_____	_____	
347	Metal Finishing	_____	_____	
35	Machinery			
351-6,9	Machanical Machinery	_____	_____	
357	Computer Equipment	_____	_____	
358	Refrigeration Equip.	_____	_____	
36	Electrical			
361-6,8-9	Elect. Assembly	_____	_____	
3691	Storage Batteries	_____	_____	
367	Circuit Boards	_____	_____	
37	Transportation Equip.	_____	_____	
38	Scientific Instruments	_____	_____	
39	Signs/Misc.	_____	_____	
391, 6	Jewelry	_____	_____	

What evidence do you have to support this?

Audit Records show large number of companies are frequently out of compliance..... 1___

Records show a large number of complaints on individual companies..... 2___

Regulators have an undocumented sense of serious problems..... 3___

Industrial processes work with very toxic chemicals..... 4___

The industries has a bad attitude about compliance..... 5___

Solutions to environmental problems are too costly..... 6___

Comments:

1.1 What Industries are resisting regulations?

SIC CODE	DESCRIPTION	MAJOR PROBLEMS	MINOR PROBLEMS
20	Foods		
201	Meat/Poultry Process'g	_____	_____
202	Dairies	_____	_____
203	Canned & Frozen Food	_____	_____
204-5	Grain/Flour Products	_____	_____
	Other Foods	_____	_____
22	Textiles (i.e., mills)	_____	_____
23	Apparel	_____	_____
24	Lumber		
241-2	Logging, Sawmills,etc .	_____	_____
243	Millwork, Cabinets	_____	_____
25	Furniture	_____	_____
26	Paper	_____	_____
27	Printing	_____	_____
28	Chemicals		
281	Chemicals & Gases	_____	_____
282	Plastic Mat'ls & Resins	_____	_____
283	Bio-related Chem's	_____	_____
284	Soaps/Clean'g Mat'ls	_____	_____
285	Paints/Finishes	_____	_____
286	Ethanol/Organic Chem's	_____	_____
287	Agricultural Chem's	_____	_____
289	Other Chemicals	_____	_____
29	Petroleum		
291	Refining	_____	_____
295	Asphalt Products	_____	_____
299	Petrol/Coal Products	_____	_____
30	Rubber & Plastics	_____	_____
31	Leathers		
311	Tanning & Finishing	_____	_____
319	Leather Products	_____	_____
32	Stone/Clay/Glass		
321-3	Glass & Glass Products	_____	_____
324-6	Concrete, Clay Prod'ts	_____	_____
327-9	Other	_____	_____

33	Primary Metals			
333	Mining	_____	_____	
334-7	Foundry & Forming	_____	_____	
339	Primary Metal Prod'ts	_____	_____	
34	Fabricated Metals			
341-6,8-9	Metal Fab & Machining	_____	_____	
347	Metal Finishing	_____	_____	
35	Machinery			
351-6,9	Machanical Machinery	_____	_____	
357	Computer Equipment	_____	_____	
358	Refrigeration Equip.	_____	_____	
36	Electrical			
361-6,8-9	Elect. Assembly	_____	_____	
3691	Storage Batteries	_____	_____	
367	Circuit Boards	_____	_____	
37	Transportation Equip.	_____	_____	
38	Scientific Instruments	_____	_____	
39	Signs/Misc.	_____	_____	
391, 6	Jewelry	_____	_____	

What evidence do you have to support this?

Audit Records show large number of companies are frequently out of compliance..... 1___

Records show a large number of complaints on individual companies..... 2___

Regulators have an undocumented sense of serious problems..... 3___

Industrial processes work with very toxic chemicals..... 4___

The industries has a bad attitude about compliance..... 5___

Solutions to environmental problems are too costly..... 6___

Comments:

Do you know what the reason is for the resistance?

Business Owners consider the regulations unfair and unreasonable..... 1___

Business Owners are frustrated with the lack of solutions..... 2___

Business Owners feel the solutions are cost prohibitive..... 3___

Business Owners feel that everyone else pollutes much more than they do..... 4___

Business Owners are afraid regulators are "out to get them"..... 5___

Business Owners are concerned that regulations are stricter than normal conditions (tap water, outside air, etc. are out of compliance) so, "why bother?"..... 6___

Comments:

1.2 What industries do not know or understand the regulations?

SIC CODE	DESCRIPTION	MAJOR PROBLEMS	MINOR PROBLEMS
20	Foods		
201	Meat/Poultry Process'g	_____	_____
202	Dairies	_____	_____
203	Canned & Frozen Food	_____	_____
204-5	Grain/Flour Products	_____	_____
	Other Foods	_____	_____
22	Textiles (i.e., mills)	_____	_____
23	Apparel	_____	_____
24	Lumber		
241-2	Logging, Sawmills,etc .	_____	_____
243	Millwork, Cabinets	_____	_____
25	Furniture	_____	_____
26	Paper	_____	_____
27	Printing	_____	_____
28	Chemicals		
281	Chemicals & Gases	_____	_____
282	Plastic Mat'ls & Resins	_____	_____
283	Bio-related Chem's	_____	_____
284	Soaps/Clean'g Mat'ls	_____	_____
285	Paints/Finishes	_____	_____
286	Ethanol/Organic Chem's	_____	_____
287	Agricultural Chem's	_____	_____
289	Other Chemicals	_____	_____
29	Petroleum		
291	Refining	_____	_____
295	Asphalt Products	_____	_____
299	Petrol/Coal Products	_____	_____
30	Rubber & Plastics	_____	_____
31	Leathers		
311	Tanning & Finishing	_____	_____
319	Leather Products	_____	_____
32	Stone/Clay/Glass		
321-3	Glass & Glass Products	_____	_____
324-6	Concrete, Clay Prod'ts	_____	_____
327-9	Other	_____	_____

33	Primary Metals		
333	Mining	_____	_____
334-7	Foundry & Forming	_____	_____
339	Primary Metal Prod'ts	_____	_____
34	Fabricated Metals		
341-6,8-9	Metal Fab & Machining	_____	_____
347	Metal Finishing	_____	_____
35	Machinery		
351-6,9	Machanical Machinery	_____	_____
357	Computer Equipment	_____	_____
358	Refrigeration Equip.	_____	_____
36	Electrical		
361-6,8-9	Elect. Assembly	_____	_____
3691	Storage Batteries	_____	_____
367	Circuit Boards	_____	_____
37	Transportation Equip.	_____	_____
38	Scientific Instruments	_____	_____
39	Signs/Misc.	_____	_____
391, 6	Jewelry	_____	_____

What evidence do you have to support this?

Audit Records show large number of companies are frequently out of compliance..... 1___

Records show a large number of complaints on individual companies..... 2___

Regulators have an undocumented sense of serious problems..... 3___

Industrial processes work with very toxic chemicals..... 4___

The industries has a bad attitude about compliance..... 5___

Solutions to environmental problems are too costly..... 6___

Comments:

Why is there difficulty in communicating the regulations to some companies?

The companies are too small and too numerous to visit.... 1___
The language in the regulations is too general, small company owners can't interpret it..... 2___
The most effective and efficient communication medium to each industry not known..... 3___
There is a lack of technical background by the business owners..... 4___
Businesses are dispersed geographically, making it difficult to get them together..... 5___
Business owners are too busy to deal with environmental regulations..... 6___

Are there any specific regulations that are problems?
Comments:

1.3 What industries are facing yet unsolved technical problems in complying with regulations?

SIC CODE	DESCRIPTION	MAJOR PROBLEMS	MINOR PROBLEMS
20	Foods		
201	Meat/Poultry Process'g	_____	_____
202	Dairies	_____	_____
203	Canned & Frozen Food	_____	_____
204-5	Grain/Flour Products	_____	_____
	Other Foods	_____	_____
22	Textiles (i.e., mills)	_____	_____
23	Apparel	_____	_____
24	Lumber		
241-2	Logging, Sawmills,etc .	_____	_____
243	Millwork, Cabinets	_____	_____
25	Furniture	_____	_____
26	Paper	_____	_____
27	Printing	_____	_____
28	Chemicals		
281	Chemicals & Gases	_____	_____
282	Plastic Mat'ls & Resins	_____	_____
283	Bio-related Chem's	_____	_____
284	Soaps/Clean'g Mat'ls	_____	_____
285	Paints/Finishes	_____	_____
286	Ethanol/Organic Chem's	_____	_____
287	Agricultural Chem's	_____	_____
289	Other Chemicals	_____	_____
29	Petroleum		
291	Refining	_____	_____
295	Asphalt Products	_____	_____
299	Petrol/Coal Products	_____	_____
30	Rubber & Plastics	_____	_____
31	Leathers		
311	Tanning & Finishing	_____	_____
319	Leather Products	_____	_____
32	Stone/Clay/Glass		
321-3	Glass & Glass Products	_____	_____
324-6	Concrete, Clay Prod'ts	_____	_____
327-9	Other	_____	_____

33	Primary Metals			
333	Mining	_____	_____	
334-7	Foundry & Forming	_____	_____	
339	Primary Metal Prod'ts	_____	_____	
34	Fabricated Metals			
341-6,8-9	Metal Fab & Machining	_____	_____	
347	Metal Finishing	_____	_____	
35	Machinery			
351-6,9	Machanical Machinery	_____	_____	
357	Computer Equipment	_____	_____	
358	Refrigeration Equip.	_____	_____	
36	Electrical			
361-6,8-9	Elect. Assembly	_____	_____	
3691	Storage Batteries	_____	_____	
367	Circuit Boards	_____	_____	
37	Transportation Equip.	_____	_____	
38	Scientific Instruments	_____	_____	
39	Signs/Misc.	_____	_____	
391, 6	Jewelry	_____	_____	

What evidence do you have to support this?

Audit Records show large number of companies are frequently out of compliance..... 1___
Records show a large number of complaints on individual companies..... 2___
Regulators have an undocumented sense of serious problems..... 3___
Industrial processes work with very toxic chemicals..... 4___
The industries has a bad attitude about compliance..... 5___
Solutions to environmental problems are too costly..... 6___

What is the nature of the required technologies?

The technologies are very expensive..... 1___
The technologies exist only in laboratory settings..... 2___
The technologies do not exist..... 3___
The technologies are too complex..... 4___
The technologies are not well known..... 5___

Are there any specific regulations that are problems?
Comments:

1.4 What industries are facing high costs to comply with regulations? (The technology may be there but it is expensive)

SIC CODE	DESCRIPTION	MAJOR PROBLEMS	MINOR PROBLEMS
20	Foods		
201	Meat/Poultry Process'g	_____	_____
202	Dairies	_____	_____
203	Canned & Frozen Food	_____	_____
204-5	Grain/Flour Products	_____	_____
	Other Foods	_____	_____
22	Textiles (i.e., mills)	_____	_____
23	Apparel	_____	_____
24	Lumber		
241-2	Logging, Sawmills,etc .	_____	_____
243	Millwork, Cabinets	_____	_____
25	Furniture	_____	_____
26	Paper	_____	_____
27	Printing	_____	_____
28	Chemicals		
281	Chemicals & Gases	_____	_____
282	Plastic Mat'ls & Resins	_____	_____
283	Bio-related Chem's	_____	_____
284	Soaps/Clean'g Mat'ls	_____	_____
285	Paints/Finishes	_____	_____
286	Ethanol/Organic Chem's	_____	_____
287	Agricultural Chem's	_____	_____
289	Other Chemicals	_____	_____
29	Petroleum		
291	Refining	_____	_____
295	Asphalt Products	_____	_____
299	Petrol/Coal Products	_____	_____
30	Rubber & Plastics	_____	_____
31	Leathers		
311	Tanning & Finishing	_____	_____
319	Leather Products	_____	_____
32	Stone/Clay/Glass		
321-3	Glass & Glass Products	_____	_____
324-6	Concrete, Clay Prod'ts	_____	_____
327-9	Other	_____	_____

33	Primary Metals		
333	Mining	_____	_____
334-7	Foundry & Forming	_____	_____
339	Primary Metal Prod'ts	_____	_____
34	Fabricated Metals		
341-6,8-9	Metal Fab & Machining	_____	_____
347	Metal Finishing	_____	_____
35	Machinery		
351-6,9	Machanical Machinery	_____	_____
357	Computer Equipment	_____	_____
358	Refrigeration Equip.	_____	_____
36	Electrical		
361-6,8-9	Elect. Assembly	_____	_____
3691	Storage Batteries	_____	_____
367	Circuit Boards	_____	_____
37	Transportation Equip.	_____	_____
38	Scientific Instruments	_____	_____
39	Signs/Misc.	_____	_____
391, 6	Jewelry	_____	_____

What evidence do you have to support this?

Audit Records show large number of companies are frequently out of compliance..... 1___

Records show a large number of complaints on individual companies..... 2___

Regulators have an undocumented sense of serious problems..... 3___

Industrial processes work with very toxic chemicals..... 4___

The industries has a bad attitude about compliance..... 5___

Solutions to environmental problems are too costly..... 6___

What are the current recommended solutions?
Please list some examples:

2. What industries are facing few or no environmental compliance problems?

SIC CODE	DESCRIPTION	FEW OR NO PROBLEMS
PROBLEMS		
20	Foods	
201	Meat/Poultry Process'g	_____
202	Dairies	_____
203	Canned & Frozen Food	_____
204-5	Grain/Flour Products	_____
	Other Foods	_____
22	Textiles (i.e., mills)	_____
23	Apparel	_____
24	Lumber	
241-2	Logging, Sawmills,etc	_____
243	Millwork, Cabinets	_____
25	Furniture	_____
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33	Primary Metals	
333	Mining	_____
334-7	Foundry & Forming	_____
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391, 6	Jewelry	_____

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Solutions to environmental problems are too costly..... 6___

Why, in your opinion, are they <u>not</u> having compliance problems?

The industries have little or no waste..... 1___

The industries have waste, but it does not contain regulated substances..... 2___

The industries have a high level of environmental awareness and most companies are within compliance..... 3___

Solutions to compliance issues are well known and available commercially..... 4___

Regulators are uninformed of compliance/non-compliance of industries..... 5___

Comments:

3. How do you communicate regulations to private industry?

Mass mailings of bulletins and other information..... 1___
Personal contact through regulators..... 2___
Meetings with industry groups and associations..... 3___
Present communication links are ineffective..... 4___

Is it effective?

Yes.....___
No.....___

Do you have any ideas for better ways of communicating?

4. Which of the problems with environmental regulation compliance in industry could be solved by better training of both the work force and management?

5. What changes do you see coming in the next 1 to 2 years that will impact the economic growth of our industrial sector? In the next 5 to 10 years? Are there some areas of environmental concern that are departmental priorities?